MODEL AIRPLANE NEWS

12th Year of Publication

MARCH 1941
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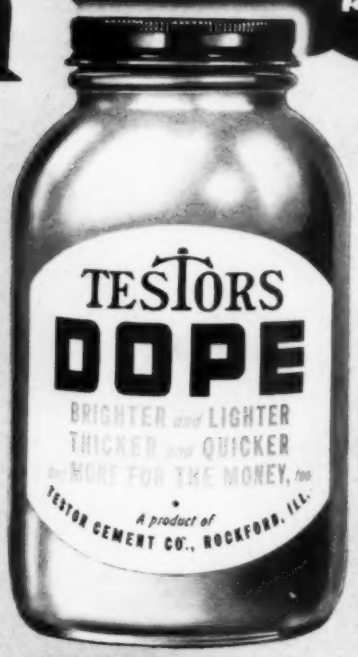

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PROP WASH

EYES AND EARS are the passive instruments of learning—hands are the active, practical instruments of learning, its lessons often more indelible. The vaunted mass production methods of our country are the result of skilled manual effort once removed; machine tools, which turn out the mass production machinery, are wrought by hand.

CONSIDER FOR A MOMENT the capacity of the most adaptable, adroit, toughest tool known to man—the human hand. On the frigid North Sea a tossing destroyer fights a bomber; in the congealing cold the crew manually operates an anti-aircraft gun with the same proficiency as an army anti-aircraft battery firing through the withering heat somewhere on the border of Italian Somaliland. No coefficient of expansion need be considered for the hand, no long years of laboratory research to develop a lubricant that will stand up effectively under a wide range of temperatures.

THE FINEST MAN-MADE precision instrument cannot match the deftness and accuracy of a surgeon's fingers as he swiftly sews the surface of a membrane having only the thickness of a cigarette paper—and without puncturing it. Again, one man's hands wield a fifteen pound sledge for long hours, while another with scarcely apparent motion engraves the Lord's Prayer on the head of a common pin. The blind use the sensitive finger tips to read what the more fortunate have written; and the mute use finger flexibility and speed for a tongue.

YET WITHIN THE PAST four decades this fine tool has been increasingly neglected; white collars have been substituted for overalls, cigarette stains for callouses. The trend becomes apparent when the aviation industry receives thirteen times as many applications for white collar jobs as there are jobs, while the applications received for aviation mechanics are only one-seventh the number of mechanics employed.

AND THIS DESPITE the fact that an aviation executive roll call reveals that 90% of these successful men started in the industry as manual workers. Further, any successful pilot will testify that his flying ability, courage, or call it what you will, is only as good as the sweet, ever-constant throbbing of his motor and the shining spotlessness of his wings. Back there on the ground is a young man in overalls who takes nothing for granted; his grimy, capable hands have checked this, tightened that and have searched for weaknesses everywhere—the man aloft will have a happy landing.

BUT NOW AS the cries for plane production mount, an appreciation of the skilled manual worker is also mounting; plane production, like wheat or steel production, depends upon willing hands.

MODEL AIRPLANE BUILDERS know this to be true from long experience. They have conceived, planned and designed their ships—then with infinite patience and fine precision . . . . have built with their hands.

The Editor

12TH YEAR OF PUBLICATION

MODEL AIRPLANE NEWS

MARCH 1941 VOL. XXIV, No. 3

CONTENTS

FEATURE
Thousands of War Birds 6

GAS POWERED
A Record Holding Nationals Winner 10

RUBBER POWERED
A Flying Twin Motor Douglas DB-7 28

GLIDERS
A Microfilm Glider 12

SCALE MODEL PLANS
N.A. Pursuit 9
The Martin B-26 14

PLANE ON THE COVER
The Martin Marauder . . . 15

DESIGN
Model Designing Simplified 22

AERO SCIENCE
Keep Them Up 10
An Easy Way to Make Microfilm 13
Lifting Or Non-Lifting Tail? . 24

NEWS
Frontiers 25
Gas Lines—Air Ways . . 20
Academy of Model Aeronautics 24
Flash News 31
Air Youth of America . . 31

Edited by
Charles Hampson Grant

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Barney

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BELL AIRACOBRA with details to make an AIRABONITA
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MESSERSCHMITT

Accurate 1/4 in. to a foot scale. Complete die-cast parts, shaped fuselage and wings, insignia sheet, etc. Each model packed in new Modelcraft 3 color boxes with picture of individual model. (Dealers please note)

FLYING MODELS

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SUPERMARINE SPITFIRE—24 in. wing spread
MESSERSCHMITT—30 in. wing spread

As the largest manufacturer on the Coast, Modelcraft has the choice of importers' balsa and only the best grade of hard balsa has gone into these kits. These are real flying models and fine replicas of their originals. Construction is simple and absolutely clear, as Modelcraft designers know that nothing will spoil your otherwise angelic disposition so fast as to get a model that is impossible to build due to mfr's carelessness.

MODELCRAFT 25c LINE

Now Ready

Pacific Ace. Over 300,000 sold! After comparing the Pacific Ace with others available, a large manufacturer recently ordered 25,000 as premiums for a radio program. Also Stinson 105—30" wing span.

SUPER SNOOPER

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$1.50

FLASH! Super Snooper wins first place rubber power contest, National City, California, January 2, Senior Division. 66 planes entered in contest.

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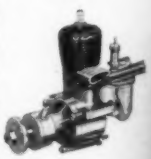
MOTORS-of-the-MONTH

OHLSSON MOTORS

Ohlsson & Rice Mfg. Co.



The story of Ohlsson engines reads like a Horatio Alger novel. From a small unknown manufacturer they have gone to the top in three years, and made an unequaled record at the last two Nationals. For years modelers had been yelling for MORE POWER and then Ohlsson & Rice came along and gave them so much it forced designers to clean up their ships and bring out a lot better ones. Personally, in the 60 Custom, I think they have too darn much power. Spook 72 is guaranteed to handle it, but many models can't.

Credit for the Ohlsson achievement goes to Irwin G. Ohlsson who has known what the boys wanted and needed and to his partner, Harry T. Rice, whose technical knowledge and manufacturing ability complement and aid Ohlsson's.

Ohlsson 60 ($21.50) for Spook 72, Ohlsson 23 ($16.50) for Spook 48 or Sky Baby, and the Ohlsson 19 ($14.50) with Miss Tiny are close to unbeatable combinations under any circumstances.

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★ MODELCRAFT ★

LARGEST SUPPLY HOUSE IN THE WEST ★ 7306 SOUTH VERMONT AVENUE, LOS ANGELES, CALIF.

"SPOOK"

(SCOOP)

GULL WING DESIGN COMES INTO ITS OWN

Modelcraft Engineers Admit They Can Improve On a Lot of Things—But Not On Nature Itself

"72" Suppose we start with a recent user letter. "In ten flights Sunday with my SPOOK 72, not one was under 1:43, altitude 6,000 feet, temperature freezing (Dec. 22), about 6 inches of snow on the ground. (Denver, Colo.) This is the 136th flight for this model with no crackup." Signed L. W. Fick.

Modelcraft designers have long known that senior aircraft manufacturers use birds as a basis of aircraft design, and many long hours have been spent watching gulls in flight along the coast. Recognized for their unsurpassed soaring ability, gulls have the most pronounced "gull wing" of any birds. Hence, the gull wing design on the new SPOOK in which we have demonstrated conclusively to the most skeptical model flyer the practicability and outstanding soarability of this design.

If you are an expert, you may not care about simplicity of construction, but the facts are that you could literally build two Spooks in the time required to build another high performance model. And nobody will say you did a heck of a lot of work, just to put an engine in the air! Price, with covering and wheels, complete..... **$3.95**
Plans ONLY—**50c**

"48" Another typical letter: "Please send me another SPOOK 48. This is my second SPOOK this year. My first did 4 min. 42 sec. on the third flight with an Ohlsson 23. I am for them 100%. Please rush the order." Signed, Dean McMillan, Charleston, Ill.

Because of year round flying conditions here in California, the SPOOKS have probably had more flying use than any of the new high performance models. It is therefore NOT AN EXPERIMENT. A lot of modelers think the SPOOK is a nice looking design, if that matters to you, but mainly you'll like the ship because (a) construction is so simple (no miles of formers to turn out) and (b) it will operate with any good Class A or B engine. Kit is complete. Price..... **$1.50**
Plans ONLY—**25c**

MISS TINY—CLASS "A"

When we get enough confidence to think we can design a better performing Class A ship than Miss Tiny, we will do so. Meanwhile, Miss Tiny continues to add new laurels to her long list of victories, and for the modeler interested in an "aviator's model," I doubt if you can match her. Look the field over and make your own choice. I think you'll pick Tiny. Wing span 46".

De Luxe Kit—with Voit Air Wheels	$3.95
Standard Kit—non-inflat. wheels	2.95
Dry Kit	1.95
PLANS ONLY	.25

SKY BABY—CLASS "B"

Sky Baby will take an Ohlsson 23 or Bantam wide open. With a completely NEW wing section the climb is even faster. Has won many firsts. Wing span 54", chord 7". Complete de luxe kit, Voit air wheels..... **$3.85**
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LARGEST SUPPLY HOUSE IN THE WEST ★ 7306 SOUTH VERMONT AVENUE, LOS ANGELES, CALIF.

An out-of-date Boeing used for formation-flight training

Kelly Field and Duncan Repair Field (right) from the air

THOUSANDS OF

By DOUGLAS J. INGELLS

IF THE plans the U. S. Army has been working on for the past decade function the way they are intended, and if Congress can find approximately two billion dollars, because that is what it will cost; then we are going to have an air force totaling 50,000 airplanes with an equal amount coming off the assembly line every twelve months.

Now that's a mighty big order—the greatest military expansion program in the history of our nation, but it isn't the least bit impractical in the face of world affairs today. Consequently the army's high commands have worked out a new training program that will meet all requirements in short order and give the U. S. its wartime emergency strength in pilots and planes.

Fifty thousand airplanes would be of little value if there were not enough pilots to fly them, and if you count every available pilot in the air corps, navy air fleet, the nation's commercial airlines and the "sandlot airports" you'll find that the figure will fall considerably short of the needed number.

Training fifty thousand pilots at the rate Uncle Sam has been turning them out would take this country about ten years, according to statistics. So it is apparent that something should be done to train good pilots and train them as quickly as possible.

Now, try as you may, you can't turn out good pilot material in less than six months; that is, good military pilots. This army experts will confide to you, and they don't mince words. Therefore, it is not a question of cutting down on flight training hours and getting less efficiency, but rather a question of establishing more schools to supply the needed pilot output.

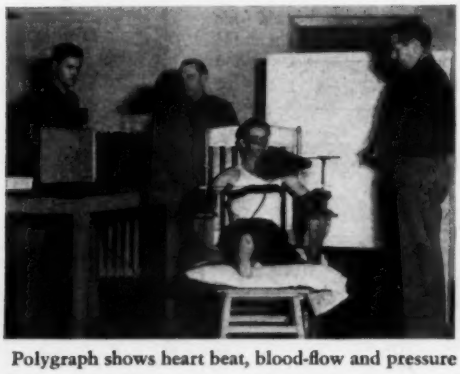
The U. S. Air Corps in recent months, because of its stiff requirements, has had a tough time getting its full quota of students to attend the flying courses at its various air colleges. The thoroughness of these requirements is ascertainable by glancing at charts which show that about fifty-four percent of students who enter training for the air corps make the grade, or about one of every six applicants is accepted.

In round figures, to have an air force of fifty thousand pilots, it would require approximately 300,000 young men to apply for the jobs. So far, that figure has fallen many thousands short. But this year and the year after, because of increased civilian flight training, it is expected that Uncle Sam will get the required number. That is all he can train, and more too.

But to accomplish this new era of pilot training the army has had its air college system torn to pieces and re-

Cadets' eyes must be perfect

Uncle Sam's husky future pilots set 'em up



Polygraph shows heart beat, blood-flow and pressure

A rebreather tests the lungs

This device tests your equilibrium

Greatest flying school on earth, the "West Point of the Air", Randolph Field

WAR BIRDS

Intimate Glimpses of How Uncle Sam Trains Men for the Most Important Job on Earth— The Aerial Defense of America

vised; from civilian schools and universities it is drawing young blood, partially-trained under CAA air-course instructors to fill the cockpits of its pursuits and bombers.

At one time the air corps devoted a full year to training a flight cadet; eight months were spent in primary and basic schooling at Randolph Field and four months of advanced training at Kelly Field Flying School. Both of these schools are in San Antonio, Texas, where, up to the last year, the army exclusively trained its birdmen.

But, under its new plan, the cadet is to be trained in less than nine months. The plan for the expansion of training facilities provides for the production of air corps pilots at the rate of 7,000 per year. In addition 3,600 bombardiers and navigators will be trained annually.

Primary training is conducted at civilian flying schools which will be materially expanded to care for increased classes. There are at present nine of these being

Airport headquarters, Randolph Field. (Acme)

The "Dodo" first collects his equipment from the stockroom

Hard study is required to graduate

Principles of maneuvers are taught with models (Acme)

Instructor explains tail mechanism and rigging principles

Trouble-shooting on one of the motor test-blocks

The operations office for primary students

The cadets live in barracks similar to the one shown above

used for primary instruction; each was selected from a group of twenty or more schools operated by civilian organizations.

Those chosen were: The Alabama Institute of Aeronautics, Tuscaloosa; The Chicago School of Aeronautics, Glenview, Ill.; Parks Air College, East St. Louis, Ill.; Lincoln Airplane and Flying School, Lincoln; The Spartan School of Aeronautics, Tulsa; Dallas Aviation School and Air College, Dallas; Cal-Aero Training Corporation, Glendale; Ryan School of Aeronautics, San Diego and the Santa Maria School of Flying, Santa Maria.

In these schools the army's warbirds learn the art of "waddling the joystick" under the watchful eyes of army-trained instructors, who are turning out pilots with the same efficiency that the army's training center at Randolph Field previously turned out at the rate of 400 a year. If you want the figures on the new schools, they are doing the job much faster. Combined they are turning out pilots capable of solo flight and military drills at the rate of 396 students every three months, nearly four times as many as those previously trained in the primary stage at Randolph Field.

Under the plan these nine schools will continue in operation expanded to their fullest possible capacity; each will open a branch school to accommodate additional students. Each of the schools is under contract to the air corps to do the job of training its future flyers. The army provides the training planes and pays the school a flat rate for its flight instruction; the schools furnish barracks and classroom facilities for the cadet, although he pays for his lodging through an allowance given him by Uncle Sam.

Dismantling and all parts of engines must be thoroughly understood

The audiometer indicates slightest deafness

The primary training offered at each school consists of approximately 152 hours of dual and solo instruction during which time the student gets the "feel of flying." Besides this actual flying instruction the cadet gets training in airplane engines, navigation, machine gunning, radio and other academic subjects necessary for the making of a "military pilot." Before he can fly an army bomber as a chief pilot, or the fastest pursuit plane, the army birdmen must have 1200 hours of flying.

From each of these schools the cadets are sent to one of the three training centers where they are assigned to basic schools for additional training, after which they progress to advanced and thence to specialized combat schools. The three basic training schools are: Gulf Training Center, Randolph Field, Texas; Southeast Training Center, Maxwell Field, Montgomery, Ala., and the West Coast Training Center, Headquarters at Moffett Field, Calif. These schools all function the same as the original training center at Randolph Field once operated.

Randolph Field is now operating exclusively as a basic training school, as are the other training centers at Maxwell Field and Moffett Field.

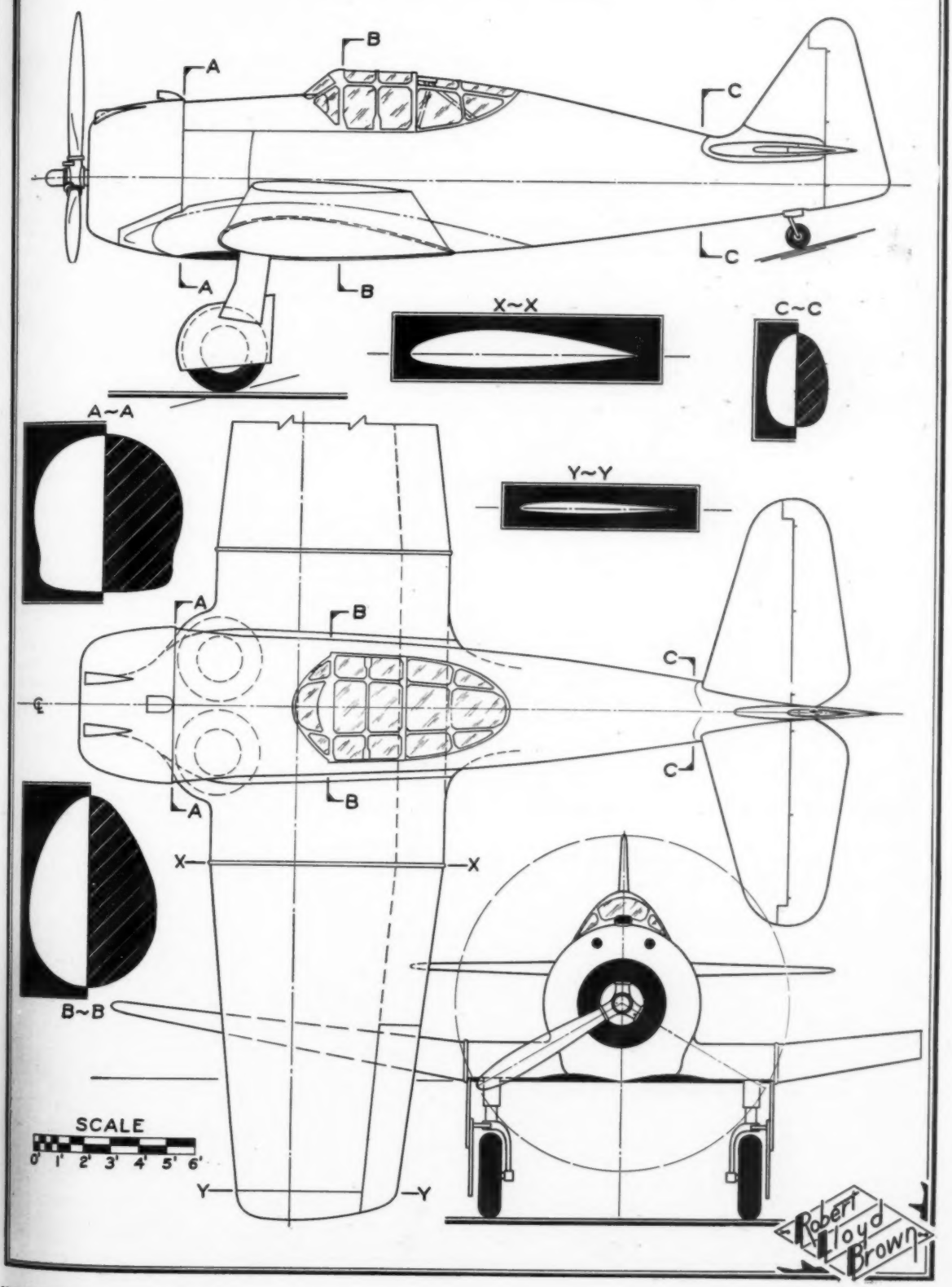
Thus, hereafter the air corps training is accomplished in four phases: Ten weeks

(Continued on page 34)

Recreation is a vital part of cadet life

800 men assemble in the attractive mess-hall (Acme)

NORTH AMERICAN NA-68 FIGHTER



KEEP THEM UP

BY ROY MARQUARDT

Part 1

EVERY year the problem arises: What should we do with the rules? It's an important question; not only our next year's contest pleasures but much of the future of our hobby depends upon the restrictions we place upon it. As long as we concentrate on endurance contests the rules problem is essentially three separate questions:

1st. Are our models flying too long?

2nd. If so, how shall we limit Class C models and

3rd. How can we adjust the rules for other classes so that the duration will be approximately the same?

The first question is easy to answer: During the past season many winning models have been lost and some cracked up. This brings up another point. Even if we limit the motor run of our present helicopters to 10 or 15 seconds, we still have the crack-up problem. The designer of the most popular gas models yet conceived liquidated nearly a half dozen of them at the '39 Nationals. What would this sort of luck do to a beginner? Obviously, in the ideal contest nearly everyone would make successful flights with the winner making the longest (not the longest in sight).

With these objectives in view, it is essential to make some radical rule changes. Fig. 1 shows clearly the direct effect of varying either the wing or power loading. It is apparent that changing the wing loading has little effect; so that a drastic power loading is indicated. The Class C power loading of 80 oz. per cu. in. motor displacement now being considered (see fig. 1) would solve the stability problem but it will probably require at least 100 oz. per cu. in. to satisfactory limit endurance for another year.

The third question is even more puzzling to most model builders. At the time of writing, it has been suggested that class C rules be 10 oz. per sq. ft., 80 oz. per cu. in. displacement; class B, 9 oz. per sq. ft., 64 oz. per cu. in. displacement; and class A, 8 oz. per sq. ft. and 48 oz. per cu. in. displacement. The wing loading variation is not bad. Fig. 1b, prepared from wind-tunnel data to be presented shortly, shows that actually Class B should have nearer 10 than 9 oz. However, the chief fault in the above rules is the allowance given small motors. Fig. 1b also shows what is common knowledge—Class B motors put out practically the same power for displacement as their larger brothers. *The class B power rule should then be just as stiff as the Class C.* On the other hand, most Class A motors show considerable reduction in power. Even the largest of these motors, however, has a natural power loading (based upon the minimum model weight of 12 oz.) of about 80 oz. per cu. in. displacement and the most impressive has a natural loading of nearly 120 oz. per cu. in. With this in mind, it seems more sensible to place the rule at about the natural limit of 80 oz. or to have no rule at all.

Study these graphs carefully, so that when your turn comes to vote on important rules you will know just what effects proposed legislation will have.

How long a model flies is simply a question of how much energy it has and how much it uses. We always have a certain amount of energy available whether it's from rubber, gasoline motor, rising cur-

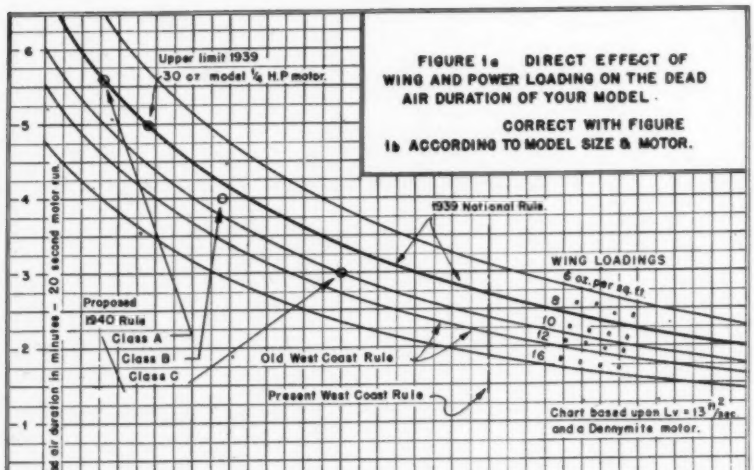


FIGURE 1a DIRECT EFFECT OF WING AND POWER LOADING ON THE DEAD AIR DURATION OF YOUR MODEL.
CORRECT WITH FIGURE 1b ACCORDING TO MODEL SIZE & MOTOR.
Upper limit 1939
30 oz model ¼ H.P motor.
1939 National Rule
WING LOADINGS
6 oz. per sq. ft
8
10
12
16
Proposed 1940 Rule
Class A
Class B
Class C
Old West Coast Rule
Present West Coast Rule
Chart based upon Lv = 13 ft²/sec and a Dennymite motor.
Dead air duration in minutes + 20 second motor run
POWER LOADING IN OZ. PER CUBIC INCH OF MOTOR DISPLACEMENT

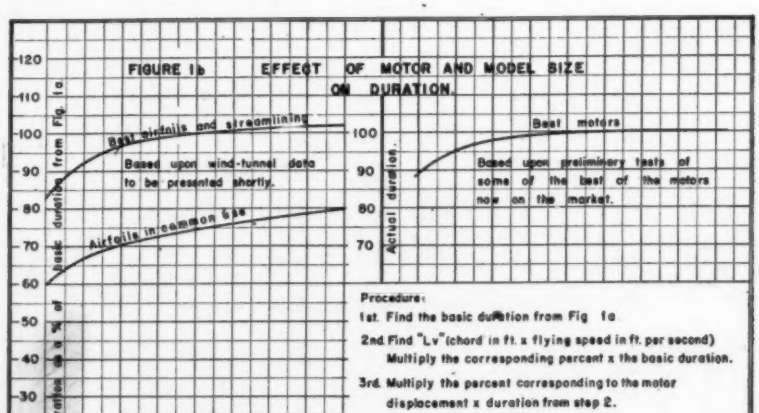
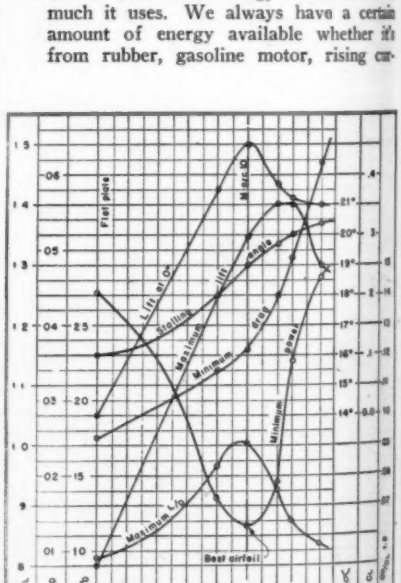


FIGURE 1b EFFECT OF MOTOR AND MODEL SIZE ON DURATION.
Best airfoils and streamlining
Based upon wind-tunnel data to be presented shortly.
Airfoils in common use
Best motors
Based upon preliminary tests of some of the best of the motors now on the market.
Basic duration from Fig. 1a
Actual duration.
Actual duration as a % of basic duration
Procedure:
1st. Find the basic duration from Fig 1a
2nd. Find "Lv" (chord in ft. x flying speed in ft. per second) Multiply the corresponding percent x the basic duration.
3rd. Multiply the percent corresponding to the motor displacement x duration from step 2.
Values of "Lv" in ft²/second.
Cubic inch motor displacement.



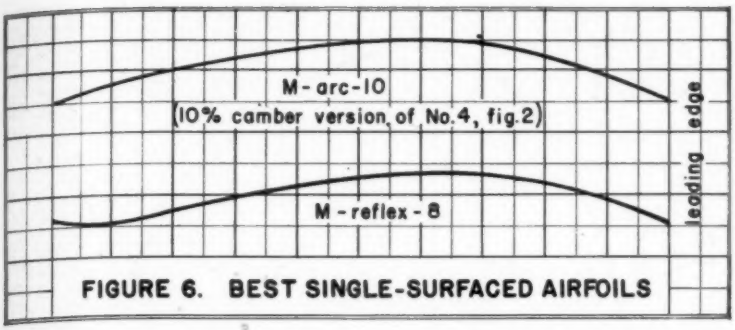


FIGURE 6. BEST SINGLE-SURFACED AIRFOILS

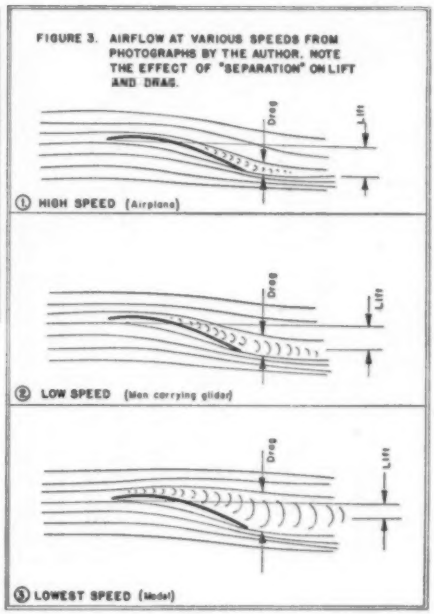


FIGURE 3. AIRFLOW AT VARIOUS SPEEDS FROM PHOTOGRAPHS BY THE AUTHOR. NOTE THE EFFECT OF "SEPARATION" ON LIFT AND DRAG.

A Presentation of the First Complete Information on Results of Airfoil Tests in the Slow-Speed Wind Tunnel

rents of air, or just a healthy heave. Our problem is to make this energy last just as long as possible.

After a bit of study we find that the rate of using energy; that is, the power required to fly an airplane, is given by the formula:

Power consumed (Footnote No. 1) =

$$29.1 \times W \times \sqrt{\frac{W}{A}} \times \frac{C_D}{C_L \sqrt{C_L}} \text{ in ft. lbs./sec.}$$

where W = weight in lbs.

$\frac{W}{A}$ = wing loading in lbs./sq. ft.

C_D = drag coefficient of entire airplane

C_L = lift coefficient of entire airplane

The importance of this formula cannot be overemphasized to any one interested in endurance models. Since the endurance of a model is simply equal to energy available, divided by the power consumed, it is obvious that the model builder's chief interest is to keep the power consumed at a minimum; while the contest board's chief task is to keep it high enough to avoid loss of too many models. Both, therefore, can profit considerably by examining the following deductions from the power equation:

1st. Let us consider the wing loading factor $\sqrt{\frac{W}{A}}$. The modeler usually can only follow the rules; however, rule-makers should examine this point closely. A glance at Fig. 1 will show that increasing wing loading does not effectively limit flights and serves chiefly to increase model costs and cause models to fly at a higher and more dangerous speed.

2nd. The weight variable (W) is a much more interesting factor. From the formula we see that with a constant source of energy, the less we can make our models weigh the longer they will fly. The present power-loading rules allow 26 oz. models to fly with ¼ h.p. motor—giving a possible average flight combination of over five minutes with a 20 sec. motor run in dead air. (If the model can be adjusted before it smashes.) If these same motors required 50-60 oz. as has been suggested by a number of model leaders, Fig. 1 shows our present 8 or 10 oz. wing loading would give us safe, sane flying without talk of higher wing loadings and 10 or 15 second motor run.

3rd. Comes the factor $\frac{C_D}{C_L \sqrt{C_L}}$ or $\frac{C_D}{C_L^{1.5}}$ This is obviously the factor which should say whether or not we win a contest; it is the only factor arising from the aerodynamic qualities of our model and will be the point of chief interest in our wind-tunnel studies. In the first place we should note that we are not interested in the gliding angle $\frac{C_L}{C_D}$ although it is closely related to $\frac{C_D}{C_L^{1.5}}$. Secondly, let us list the factors which can affect the endurance factor $\frac{C_D}{C_L^{1.5}}$:

1st. the airfoil.

2nd. the wing outline (aspect ratio, tips, etc.).

3rd. the speed and size of the model, and

4th. the drag of the body, gear, and tail.

(Continued on page 61)

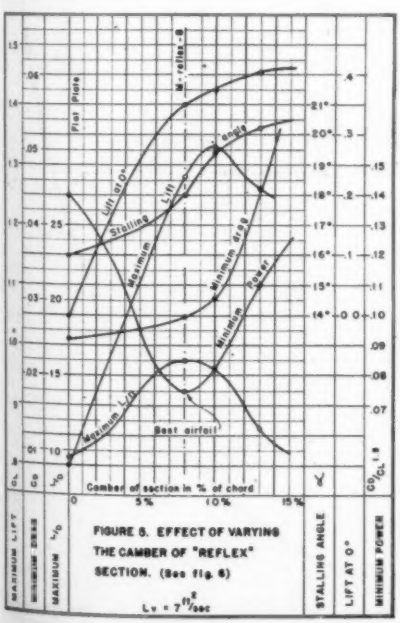


FIGURE 5. EFFECT OF VARYING THE CAMBER OF "REFLEX" SECTION. (See fig. 6)

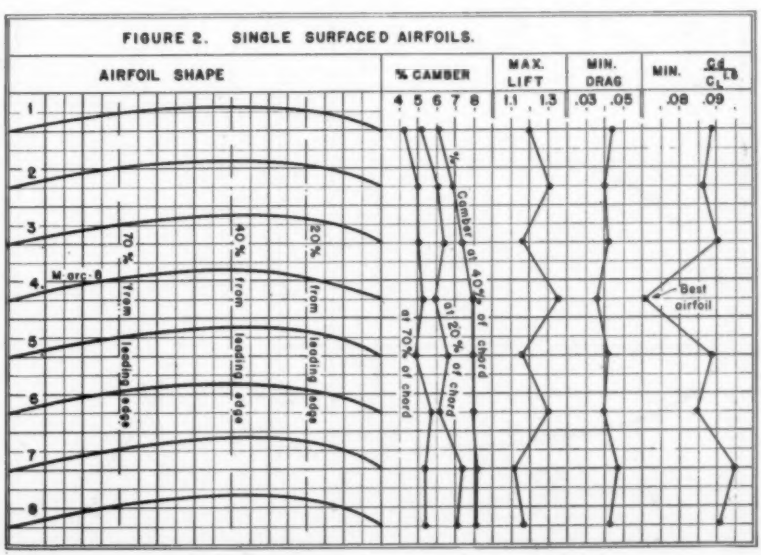
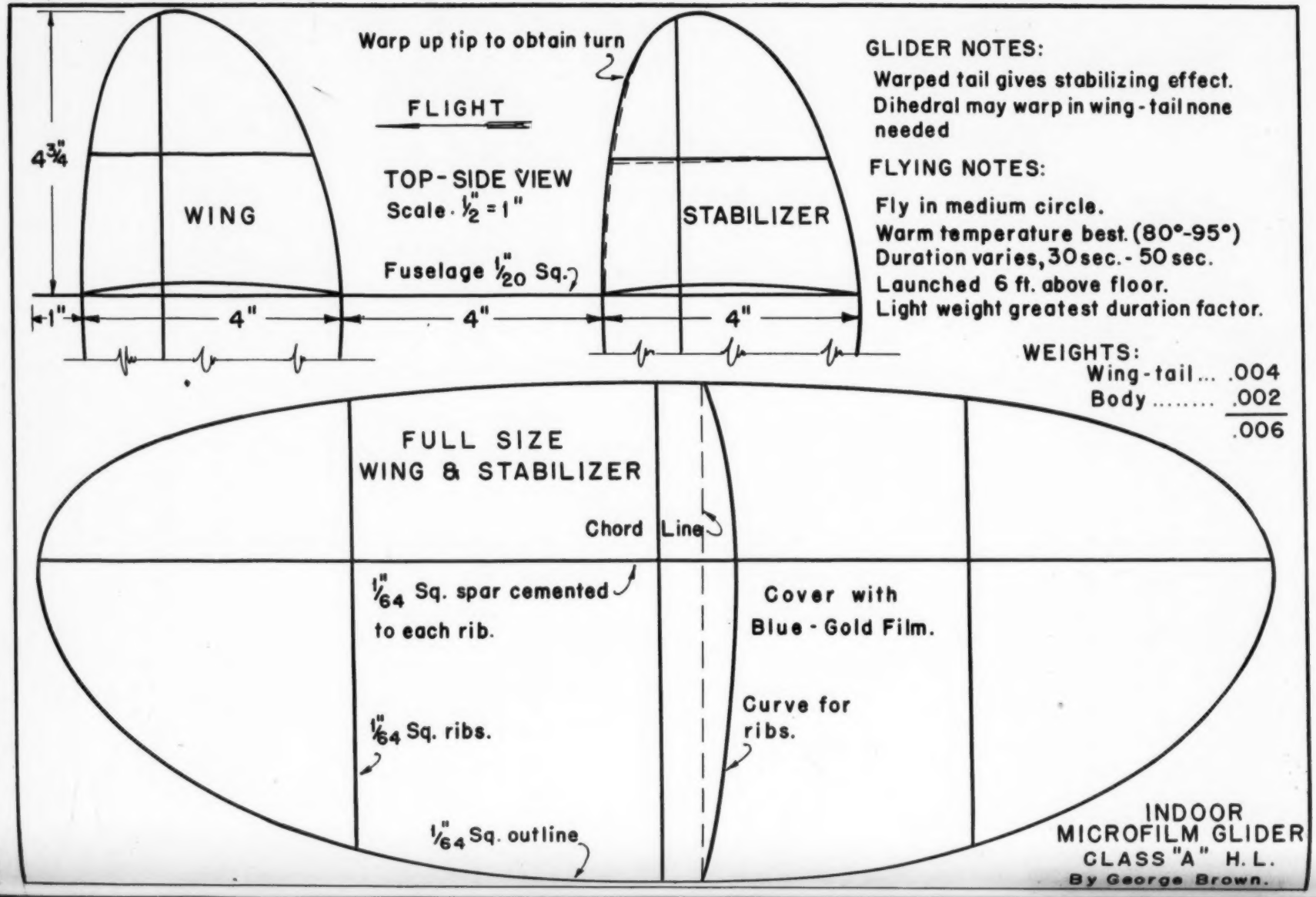
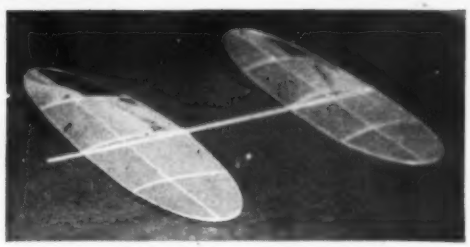


FIGURE 2. SINGLE SURFACED AIRFOILS.


Warp up tip to obtain turn
FLIGHT
TOP-SIDE VIEW
Scale. 1/2" = 1"
Fuselage 1/20 Sq.
WING
STABILIZER
4 3/4"
1"
4"
4"
4"
GLIDER NOTES:
Warped tail gives stabilizing effect.
Dihedral may warp in wing-tail none needed
FLYING NOTES:
Fly in medium circle.
Warm temperature best. (80°-95°)
Duration varies, 30 sec. - 50 sec.
Launched 6 ft. above floor.
Light weight greatest duration factor.
WEIGHTS:
Wing-tail ... .004
Body ..... .002
.006
FULL SIZE
WING & STABILIZER
Chord Line
1/64 Sq. spar cemented to each rib.
1/64 Sq. ribs.
1/64 Sq. outline
Cover with Blue-Gold Film.
Curve for ribs.
INDOOR
MICROFILM GLIDER
CLASS "A" H. L.
By George Brown.

The plane is launched gently for fifty-second glide



It's easy to make—two planes on a stick

The Microfilm Glider

How to Make a Revolutionary Plane

BY GEORGE BROWN

"HEY Joe, what time have you made? What, thirty-four seconds? What's the matter? Oh, you can't throw it up! Well what could you expect, you need more brawn and less brains to win this event."

Yes, such conversation may be heard among contestants at every indoor glider meet. After all, how could Joe, who weighs 130 lbs, throw a glider as high as his bigger and stronger competitors? Even though some modelers may construct better gliders than others, they are at a great disadvantage if they are not physically able to throw their gliders to high altitudes. More than once you have heard of builders winning stick and fuselage events by large margins, only to make very low duration in the glider event.

A new type, which eliminates all these difficulties, is offered you. Yes, a really revolutionary glider . . . A scientific model which anyone can build at one-quarter the cost and time of the present type! A microfilm glider! Surprised? Well who wouldn't be? Just think, no more glider polishing! No more straining of arms and backs!

Now the question is asked: "How could

(Continued on page 62)

An Easy Way to Make Microfilm

BY RICHARD F. HAZELTON

INDOOR endurance model flying is a sport which is not only entertaining but educational as well, requiring at least an elementary knowledge of aerodynamics as well as mechanical aptitude. This branch of model building has been prohibitive to some because of their lack of skill in the matter of making the proper covering material. However, with proper knowledge, this can become the easiest part of the construction of an indoor model.

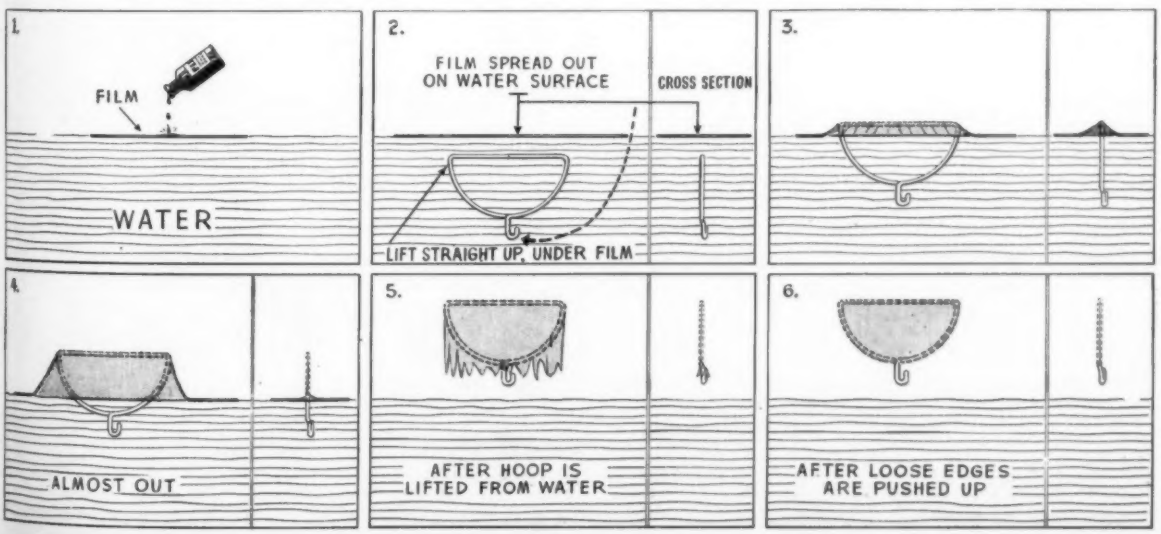
Microfilm is the most logical covering material because of its extreme lightness and comparatively high tensile strength. The most difficult part of making it by the usual method is the removal of the film from the water without straining, wrinkling or breaking it.

However quite by accident we stumbled upon a method of removing the film, which eliminates these difficulties and always produces perfect results. To make the film, proceed as follows:

Fill a bath tub or similarly large container with lukewarm water, to a depth of about 10 or 12 inches. The container must be free of lint or dust which will float and get into the film. A large container must be used so that the microfilm will spread to the fullest extent.

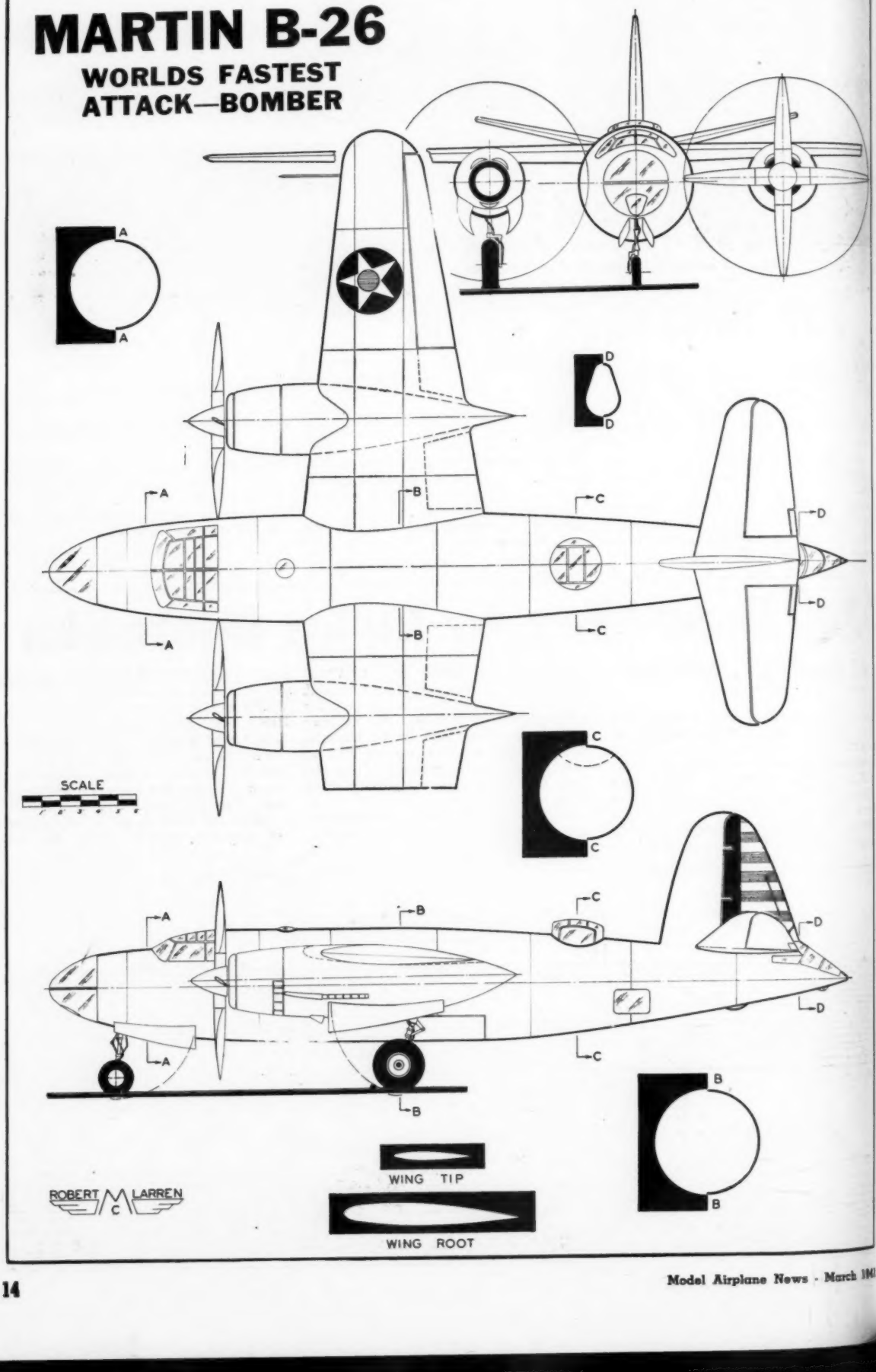
After the water is quiet, take a bottle of microfilm solution, which has been

(Continued on page 64)



MARTIN B-26

WORLDS FASTEST ATTACK—BOMBER



The army's new Martin B-26, fastest bombing plane in the world

The Martin Marauder

THE PLANE ON THE COVER

By ROBERT McLARREN

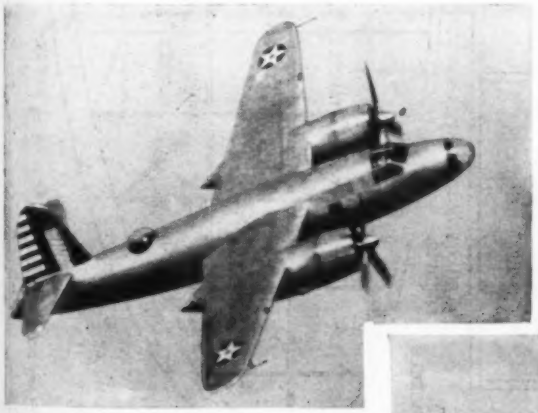
HE IS tall, middle-agish, nattily-dressed and noted for two outstanding accomplishments: he is one of the world's pioneer aircraft designers and builders and a bachelor. Glenn L. Martin designed and built his own airplane in 1908 and has never married; although his wealth, charm and smart taste in clothes makes him a much sought-after Baltimore figure. At the ambitious age of 21 years he was hard at work on a flying machine and in the Fall of 1908 had actually gone aloft for extended flights although he had NEVER SEEN AN AIRPLANE!

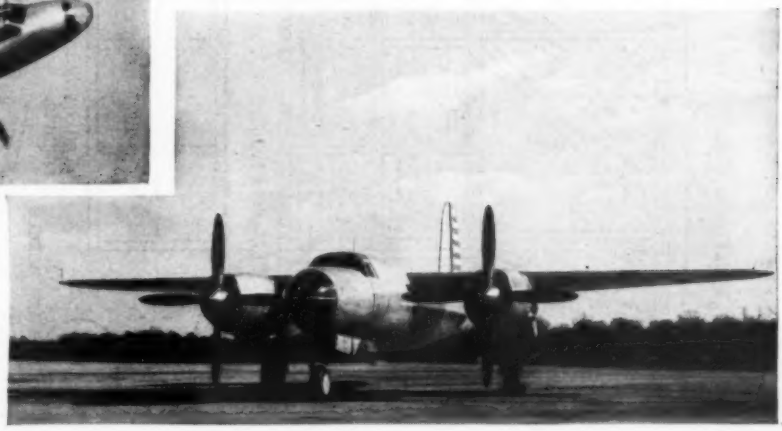
Working entirely from newspaper photographs and lengthy letters from the Wright Brothers, he completed his ship and took to the air against the irate threats and pleas of his mother, with whom he still shares his home, and his preacher-blacksmith-storekeeper father.

Glenn L. Martin became the first flier to set an over-water flight record for seaplanes when he flew the 30 miles from Los Angeles to Catalina Island in 1913. Today, Martin Flying Boats have flown an over-water distance equivalent to six round-trips to the moon.

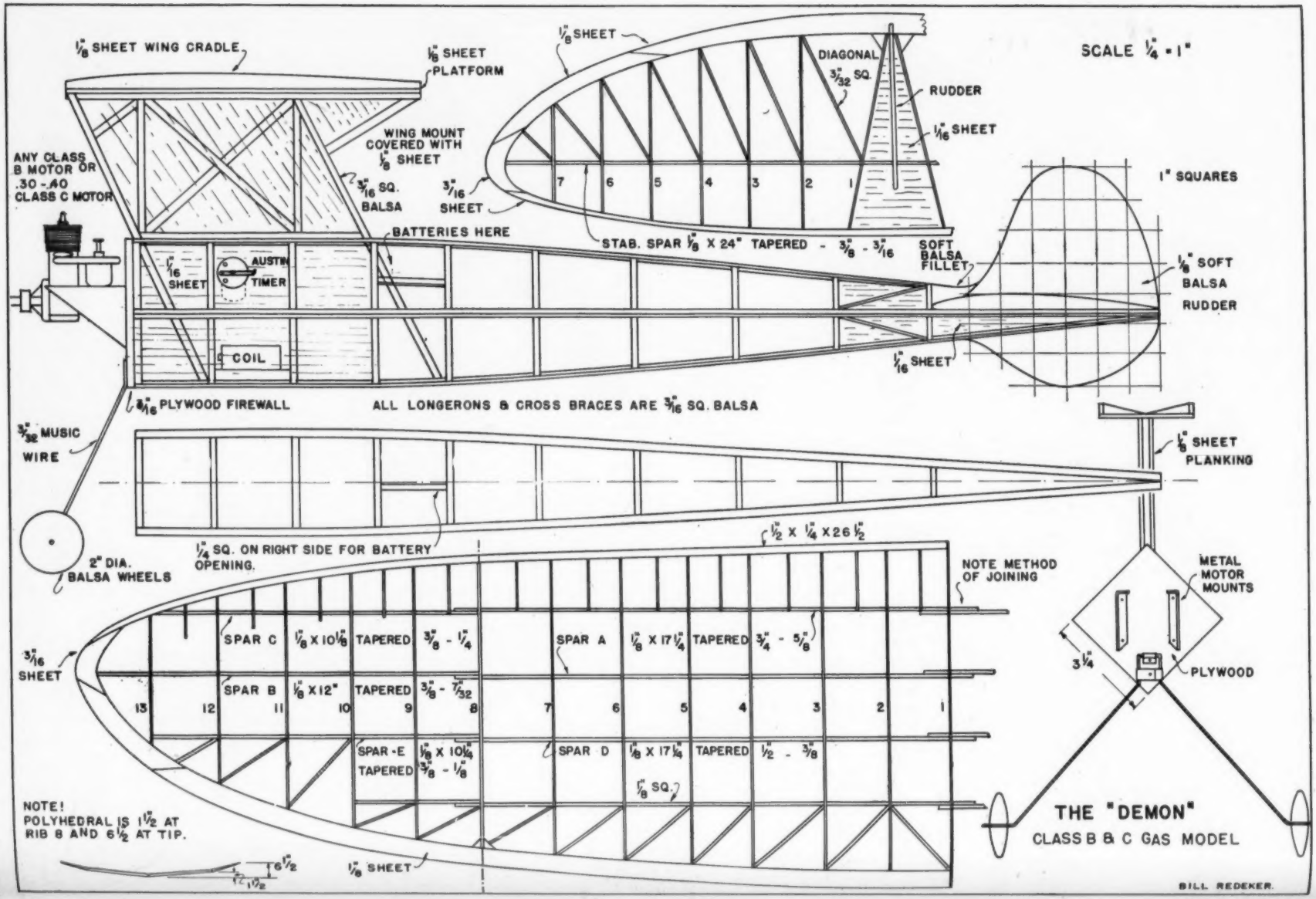
After moving his factory, started in 1909 in Santa Ana, California to Cleveland, the first Martin Bomber was built in 1918. This was the first airplane designed expressly for the then-new Liberty 400 horsepower motor and was the work of young Donald Douglas, the firm's Chief Engineer. In 1929 a small plant was erected near Baltimore. Today that tiny building has grown into the largest single-unit aircraft factory in the United States. Tremendous additions in 1937-38-39-40, the latest of which was completed in just 77 days, have brought Martin's total floor space to 1,097,000 square feet. This present huge plant is world-renowned for its layout, simplification and general productive cleanliness and efficiency. Particular emphasis has been laid on research and development of experimental processes and designs;

(Continued on page 56)





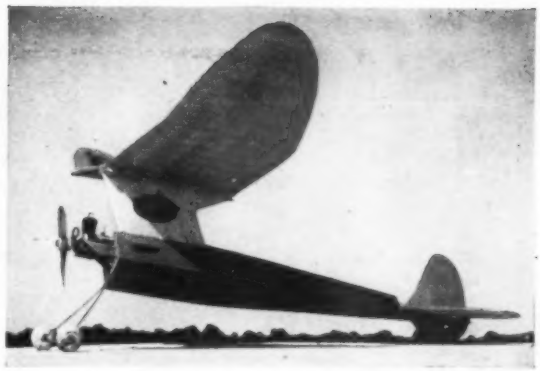
Three views of the B-26. It is powered with two 1850 hp. P&W engines turning four-bladed propellers. The gross weight is 26,625 pounds. With a crew of five it is said to have a top speed of over 400 m.p.h. Tests are now being made.


SCALE 1/4" = 1"
1/8" SHEET WING CRADLE
1/8" SHEET PLATFORM
WING MOUNT COVERED WITH 1/8" SHEET
ANY CLASS B MOTOR OR .30 - .40 CLASS C MOTOR
3/16 SQ. BALSA
3/16" SHEET
1/8" SHEET
DIAGONAL 3/32 SQ.
RUDDER
1/16" SHEET
7 6 5 4 3 2 1
1" SQUARES
BATTERIES HERE
STAB. SPAR 1/8" X 24" TAPERED - 3/8" - 3/16
SOFT BALSA FILLET
1/8" SOFT BALSA RUDDER
1/16" SHEET
AUSTIN TIMER
COIL
3/16" PLYWOOD FIREWALL
ALL LONGERONS & CROSS BRACES ARE 3/16 SQ. BALSA
3/32" MUSIC WIRE
1/8" SHEET PLANKING
1/2" X 1/4" X 26 1/2"
1/4" SQ. ON RIGHT SIDE FOR BATTERY OPENING.
2" DIA. BALSA WHEELS
NOTE METHOD OF JOINING
METAL MOTOR MOUNTS
3 1/4"
PLYWOOD
3/16" SHEET
SPAR C 1/8 X 10 1/8 TAPERED 3/8 - 1/4
SPAR A 1/8 X 17 1/4 TAPERED 3/4 - 5/8
SPAR B 1/8" X 12" TAPERED 3/8 - 7/32
13 12 11 10 9 8 7 6 5 4 3 2 1
SPAR E 1/8 X 10 1/4 TAPERED 3/8 - 1/8
SPAR D 1/8 X 17 1/4 TAPERED 1/2 - 3/8
1/8" SQ.
NOTE!
POLYHEDRAL IS 1 1/2 AT RIB 8 AND 6 1/2 AT TIP.
6 1/2
1 1/2
1/8" SHEET
THE "DEMON"
CLASS B & C GAS MODEL
BILL REDEKER.

A RECORD HOLDING NATIONALS WINNER

Build and Win Contests With This Plane That Made a National Three-Flight Average Class B Senior Record of 9 Min. 20.3 Sec. at the 1940 National Meet

By BILL REDEKER



The national record-holder ready to go places

WITH a defiant scream and a challenge to the clouds, a mighty little ship leaves the hands of its builder — — up, up, up into the blue, climbing higher and higher with a tight vertical that commands the admiration and respect of every model builder on the field. Fainter and fainter grows the high-pitched roar of the motor as the little ship is rocketed skyward. Then, as the twenty-second mark is reached, it flips out on top, begins a long, flat glide, soars majestically while spectators gasp as another first-place is hung up with its line of victories.

It's the "Demon," fellas, the little ship that can't be beat! It's made a flight of 28 min. on a 10-sec. engine run.

The plans call for the installation of an "Ohlsson 23," but the "Demon" may easily be converted to a class C ship by using a "Baby Cyclone." In taking advantage of the adaptability of this fine performer as a dual class ship, the builder should take care in conforming to the weight rule. The wing area is 3.29 sq. ft. (474 sq. in.) and with an Ohlsson the ship must weigh at least 26.5 ounces to have an even 8 oz. wing loading. The use of a Baby Cyclone calls for 28.8 ozs. as its minimum weight. This yields an 8.75 oz. wing loading.

Due to the chance of losing a ship in a contest, this plane was primarily designed for simplified construction without sacrificing its performance. If you lose your ship one week you should have easily completed and thoroughly tested another potential winner by the time the next week rolls around.

The Wing

The wing is of the elliptical type with polyhedral built-in to insure complete stability under extreme power. Its construction is light yet stressed to "take it" under the roughest treatment in flight or in contact with obstacles.

Enlarge the plans upon a suitable piece of paper and tack them to a board or work table. Cut the trailing edge from medium 1/8" sheet and put in place upon the plans. Then, using light pins and nails, bend the leading edge to its shape. Cut the ribs from 1/16" sheet and put the ribs in the tip section, slide the tip spars into place and use the same procedure for the center sections. When the four separate sections are dry, glue them together at the polyhedral joints. Covering is of "Silkspan" or bamboo paper. Two coats of thinned-out dope are suggested. Sanding with fine finishing sandpaper will give a smooth surface.

WING DESIGN BY COURTESY COMET MODEL AIRPLANE CO.

The Tail Assembly

The stabilizer is constructed by cutting out the leading and trailing edges and tacking them in place upon the board. Then cut the tapered spar and slide the ribs onto it and glue the entire structure as you place the ribs and spar inside the leading and trailing edges. Using 3/32" square balsa, glue in the diagonal braces which run from the spar to the trailing edge. Then plank the center section with 1/16" sheet on top and bottom as the plans show. Cover the stabilizer with "Silkspan" and cut the rudder from 1/8" sheet. Sand the rudder to a streamlined section, cover with "Silkspan" and glue firmly in place on the stabilizer. Two coats of thinned-out dope will be sufficient.

The proud winner with his high-flying "gas bird" after the record flight.

The Fuselage

The fuselage is built of hard 3/16" square balsa strips. Two congruent sides are first constructed. Lay out the longerons upon the plans and secure them to their bended position with light nails. Glue in the cross-pieces and let dry.

The same procedure is used in making the other side. After both sides are completely dry, carefully set up the two opposing sides and glue the cross-pieces in place as is shown on the plans. In doing this last be very careful to see that the four angles formed by the sides are all equal to 90 degrees. Using 3/16" sheet plywood, cut a square piece conforming to the cross section of your fuselage. Glue this in place with plenty of glue, as an extra amount of glue is many times worth its weight, in building the fuselage and wing mount.

Build the wing mount of 3/16" square hard balsa, as was used in the fuselage. This is built flat upon the plans. While the wing mount is drying, plank the top half of the fuselage with 1/16" sheet. As the builder will notice, the pieces that form the leading and trailing edges of the wing mount are long enough to reach through to the bottom of the fuselage. These square pieces are notched where they meet the top stringer. The uppermost longeron is notched in the corresponding place to give a tight joint. With these notches cut, glue the wing mount frame firmly to the top and bottom longerons. After this step is finished, plank the wing mount frame with 1/8" sheet and round off the edges with sandpaper. The platform is built of 1/8" medium sheet balsa. The pieces are 3" wide and the grain runs spanwise. These pieces are glued at right angles to the upright mount. Then, glue the two pieces of 1/8" sheet, cut to the curvature of the bottom of the wing, into place. Lugs for the rubber bands are made of rounded hardwood, inserted into the wing mount.

With the wing mount out of the way, proceed to bore the holes for the metal motor mounts. In doing this the builder should take special care in getting the right thrust line. It is best to secure the nuts firmly to the bolts by coating them thoroughly with cement behind the firewall.

The wiring is the next important step. Refer to the plans for the location of the coil and the timer. The coil is firmly cemented to the bottom of the fuselage; the timer is glued to the sheeting on the front of the fuselage. The battery box is mounted as shown on the plans. In wiring up the Demon be sure that all connections are well soldered.

Bend the 3/32" steel wire to the shape on the plans. Make the small duraluminum

FULL SIZE
WING RIBS
BILL REDEKER
SECTIONS: Trailing Edge
Leading Edge
RIBS 1 & 2
RIBS 3 & 4
RIB 5
RIB 6
RIB 7
RIB 8
RIB 9
RIB 10
RIB 11
RIB 12
RIB 13

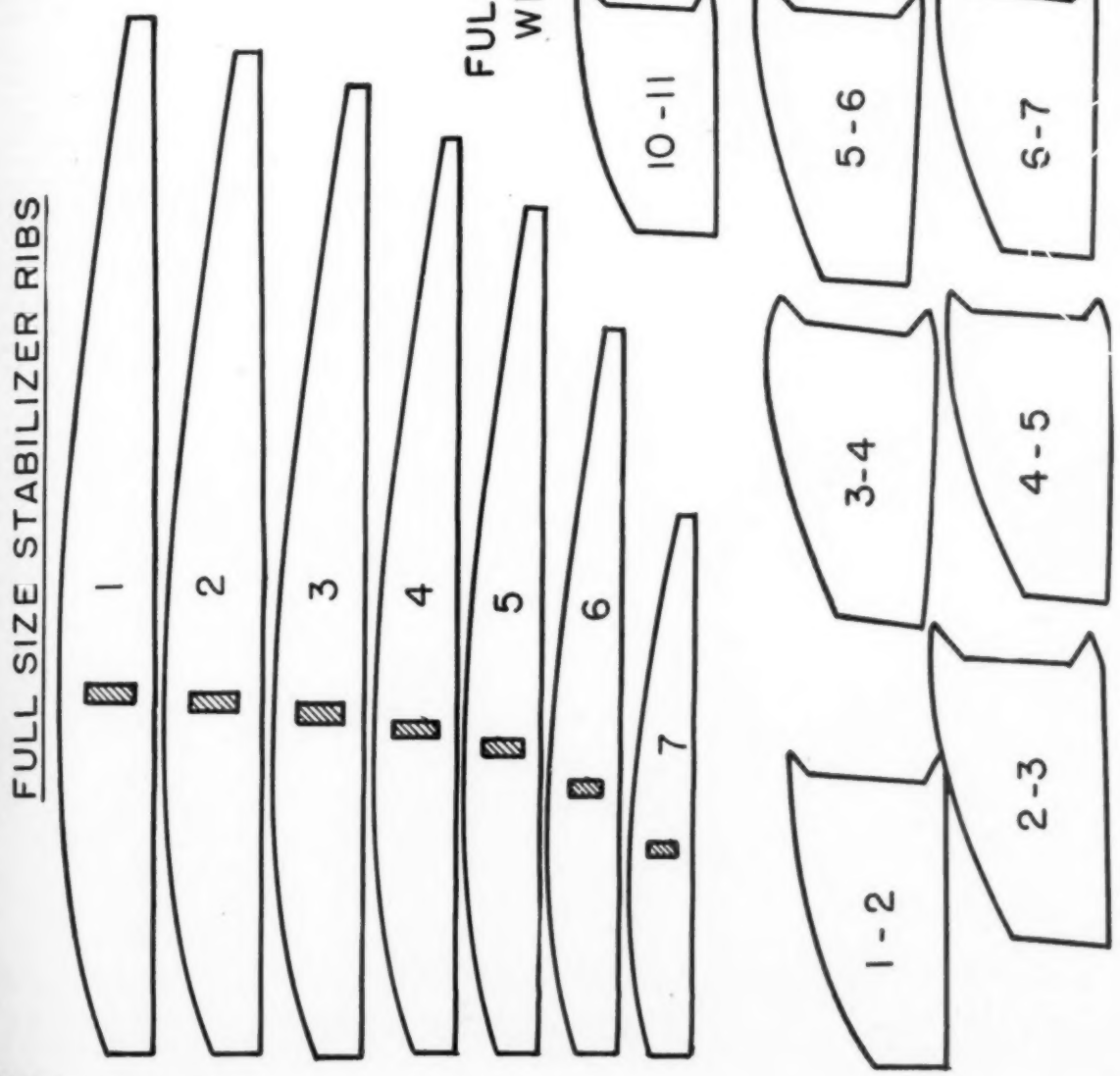
fittings and bolt the landing gear to the bulkhead. Use 2" balsa wheels. Now that the interior is complete, plank the two bottom sides and sand the entire structure. Then cut the top longeron off at the last cross-piece to allow for the tail mount. The stabilizer should then rest on the tail mount parallel to the thrust line. The last diagonal braces in the rear of the fuselage are now put in place and the structure is ready for covering. Two heavy coats of dope are recommended to prevent the fuselage from becoming oil soaked. The sub-rudder is cut from soft 1/8" sheet and is glued in place. Bend a soft iron wire to conform to the outline of the sub-rudder to prevent mashing the soft balsa while the ship is on the ground.

Flying

The one and only secret to successful flying, the one point often overlooked by many builders, is that of trimming your ship down to its maximum possible performance. To do this, the builder should experiment with his model incessantly. To begin with, the model should balance about half-way back on the wing mount. All settings must be neutral. A low power test is advised after the plane has been hand-glided to determine its proper balance.

After a few test hops, in which you have noticed some of the ship's characteristics, experiment slowly with the rudder and elevator settings until you have a spiralling climb and a slow, flat glide. When this stage has been reached you are ready for the final power tests. After the ship has performed to your highest approval it would be well to take a pencil and mark the rudder setting on the bottom of the stabilizer. This is accurately accomplished by marking the outline of the tail mount upon the stabilizer. Before each day's flying be sure to see that this position is securely maintained, by using pins

(Continued on page 54)



GAS LINES

AIR WAYS

NEWS OF MODELS AND BUILDERS FROM ALL PARTS OF THE WORLD

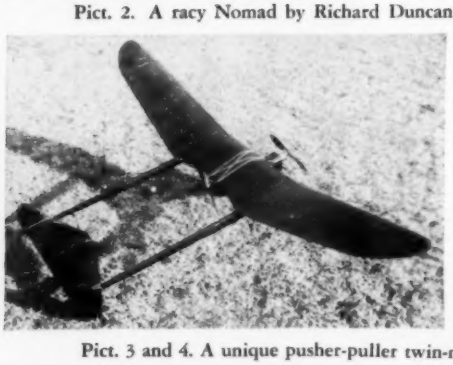
Pict. 1. A one-wheeler takes off at the G.M.A.A.S.C. Contest, Dec. 8th, '40

EDITORIAL

THE present objective of model builders, in designing 99% of their planes, is to obtain duration; which singularity of purpose, because of specialized requirements, has caused such designs to be more-or-less fundamentally similar. Upon attending contests we find a large percentage of the models based on the same design, variety becoming less and less as time goes on. This tends towards producing modelers with single-track minds and fails to bring to their attention, through the necessity of building the same type of ship, the technique of designing for various purposes. Thus the information and knowledge enthusiasts may derive from the sport, and also the inspiration to experiment, is curtailed.

A vital characteristic of the model game is the opportunity it affords for extensive experiment; it acts as an outlet for young men's imaginations and unique ideas. They have a chance to "try their wings," so to speak, incorporating their own ideas and testing them out; the cost being well within their means compared to experiment with full size aircraft.

Pict. 2. A racy Nomad by Richard Duncan



Pict. 3 and 4. A unique pusher-puller twin-motored gas job that flies beautifully

A number of fans have suggested that other types of events be held, such as speed and weight-carrying. We think there is some basis for argument here.

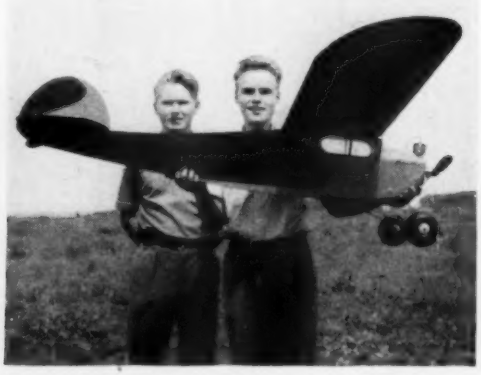
In building a speed gas model, problems present themselves which greatly differ from those of duration models. Consequently such an event will afford an opportunity for model builders to test their ingenuity and knowledge of aerodynamics.

Some have talked against speed contests because, they say, you cannot get a model to fly straight for a given distance so that its speed may be accurately measured. Proponents of this view are overlooking the heart of the argument: The essential problem in a speed model is to design it so it will fly straight—and no builder will ever learn to do this unless he attacks and solves this problem.

If young men do not wish to solve problems of this sort, but merely enjoy the sport of flying, we suggest they stop designing planes, go to a department store, buy a ready-made plane and fly it. They are in a different class from the model builder who wishes to learn something from the art and test his design and building ability in competition with others.

It is perfectly possible to design a speed model that will fly straight. The design of such a ship, however, must embody certain characteristics which will bring about this type of performance. The problem presenting itself is to determine what design is

Pict. 5. Wilfred Orr launches his Black Hawk, that has 500 flights to its credit



Pict. 6. Buel and Russell Carter with their "pride and joy," a Forster-powered Powerhouse that has made 94 flights

Pict. 7. Bill Whittet with his consistently winning Ohlsson-powered KGS

Pict. 8. Don Foote and his finless high-aspect-ratio soarer

Pict. 9. A realistic Madewell Mite-powered modification of the TD Coupe, by R. S. Timm

required.

We are always pleased to answer any questions pertaining to design, and shall be glad to put such answers in future "Gas Lines" columns.

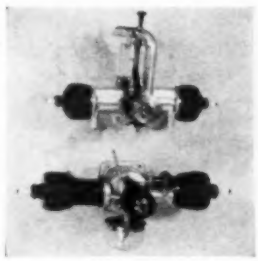
Weight-carrying models are quite different from duration ships, and it immediately becomes necessary in such a case to give extreme attention to the design and construction of the airplane, so that it will be extremely strong and as light as possible. This involves study of stresses developed. To determine this one must understand geometry, mechanics and strength of materials; subjects of vital importance in large aircraft design. In other words, such an event would help to qualify young men for active part in aviation upon becoming "of age".

In order to intrigue the interest of intelligent model builders and keep the art from getting in a rut, let us have some new events such as these; to test ingenuity and knowledge as well as inspire modelers to greater accomplishments.

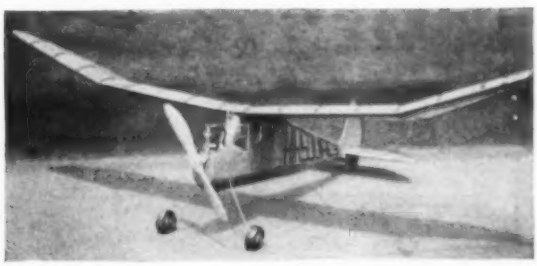
Here is some disconcerting news for those who contend that Class A ships are at a great disadvantage compared to larger ones. At the 9th annual contest of the Gas Model Airplane Association of Southern California, Inc., held December 8th, at the Assn.'s model airport, Rosecrans and Western Avenues, Los Angeles; a Class A model, flown by John Drobshoff, won with a flight of 12 minutes 30 seconds. His model was of original design, Madewell-powered. Paul V. Niemela, flew his Tiger-powered plane for 6 minutes 30-1/3 seconds.

Our hats are off to Drobshoff and we hope he continues to demonstrate the possibilities of properly-designed Class A jobs. Mr. William L. Butler of 600 W. Buckthorn Street, Inglewood, who sends this account, tells us that this flight was largely due to a thermal. Nevertheless it is to be commended.

Three hundred seventy entrants participated and slightly over 3000 people witnessed the events. Entrants came from as far as Berkeley and San Francisco; some from Phoenix, Arizona. Over 100 prizes were given away; first was $50 plus choice of merchandise. An outstanding prize was a course in aircraft sheet metal work valued at $85 and donated by the Warren School of Aeronautics.

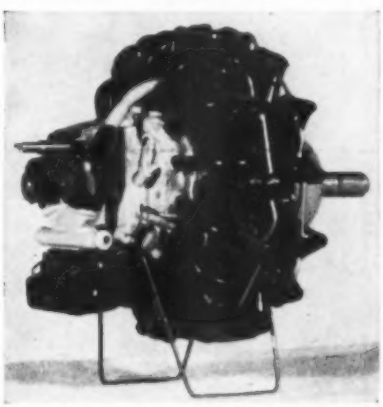


Pict. 11. Two fine engines made by Edwin C. Schunke



Pict. 10. With different motors this ship won a Class A and Class B event

Pict. 12. A dummy model of a P & W Wasp Jr. less than three inches in diameter, by Don Armstrong



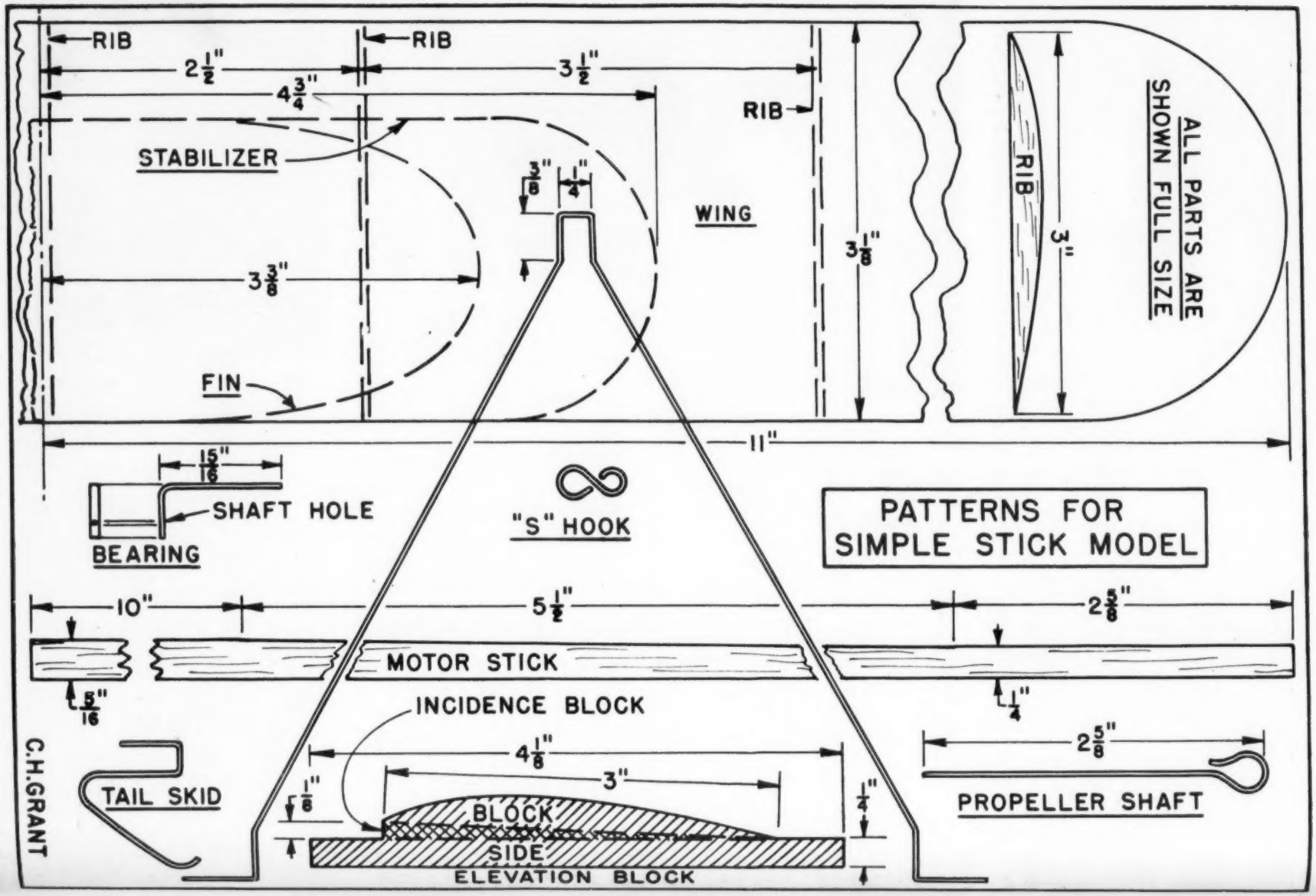
Picture No. 1 shows a take-off of one of the models.

Other winners were: Eunice Erven, first and Mrs. E. J. Brown, second in the Wom-

(Continued on page 66)

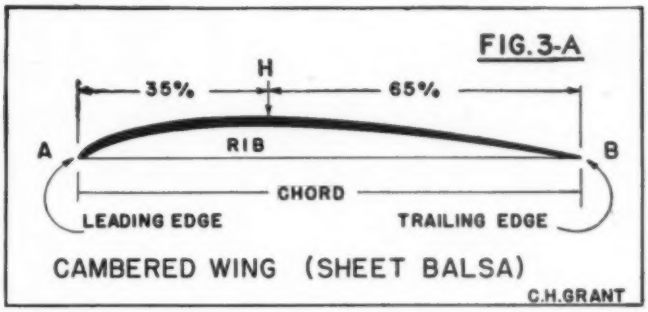
Pict. 13. A view of the Mid-West Model Airplane Contest at Greenfield, Ia.

Pict. 14. Stanley Dubowski receives 1st place trophy in the Stix, Baer & Fuller Solid-Scale Contest


RIB
RIB
RIB
2 1/2"
3 1/2"
4 3/4"
STABILIZER
WING
FIN
3 3/8"
3 1/8"
3/8"
1/4"
11"
ALL PARTS ARE SHOWN FULL SIZE
RIB
3"
15/16"
SHAFT HOLE
BEARING
"S" HOOK
PATTERNS FOR SIMPLE STICK MODEL
10"
5 1/2"
2 5/8"
MOTOR STICK
5/16"
1/4"
INCIDENCE BLOCK
4 1/8"
3"
2 5/8"
TAIL SKID
1/8"
1/4"
BLOCK
SIDE
ELEVATION BLOCK
PROPELLER SHAFT
C.H.GRANT

MODEL DESIGNING SIMPLIFIED

By CHARLES HAMPSON GRANT



Basic Operations Required for Model Building and How to Use Them to Create the Structural Parts for Your First Rubber-Powered Model Plane

Article No. 4

TO CREATE a successful model plane it is necessary to consider various progressive steps. First, you must know the purpose for which it is to be made. Second, it must be designed, all aerodynamic factors and relative proportions being determined. Third, layout drawings must be made from which the plane may be constructed. This is the point which now has been reached in this series.

Basic Construction Operations

Before starting construction it is advisable to look over the drawings of the plane carefully and have a detailed picture of it well fixed in your mind. Up to this moment the creation of your plane has been entirely "head work"; now the builder must coordinate his hand with his mind; he must be skilled in certain fundamental operations. Otherwise a great deal of material may be spoiled and wasted, or the finished structure will be so crude and inaccurate it will have little semblance to the form intended.

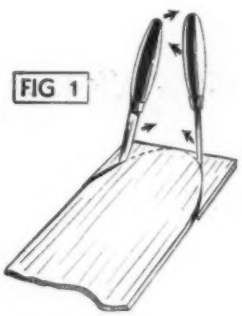
The fundamental operations in which you should be skilled are: First, the use of a pen-knife, including the operations of cutting a balsa sheet, shaping down a stick or cutting a propeller blade. Second, the use of sandpaper to shape and finish various parts in the desired manner. Third, ability to make strong cemented joints. Fourth, wire bending. This is probably the most difficult of all and, as might be expected, most important. Fifth, ability to bind parts together with thread so the finished assembly will be neat and strong.

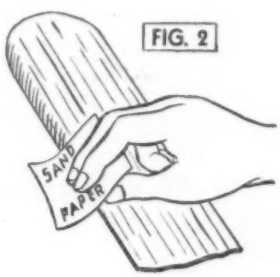
Before beginning actual construction it is suggested you try out these various operations on scrap material. Try cutting out patterns from balsa sheet for instance, determining the correct angle at which to hold the knife. Figure No. 1 shows how a wing tip should be rounded and the approximate angle of the knife when performing such an operation; the cut should be with the grain and never against it, the direction being indicated by arrows. Usually these operations involve care not only to cut the wood properly but not to carve yourself; builders are often so busy with the right hand that they forget the left hand may be placed so a slip of the knife would cause injury. Like all other things, "practice makes perfect," so if at first you appear clumsy do not be discouraged, for model building will measure your determination and persistence.

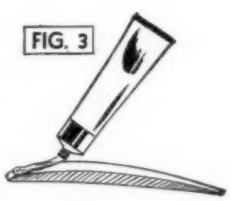
To try out the second operation take a scrap piece of balsa and with fairly coarse or medium sandpaper, round down one edge. This operation is shown in figure No. 2. The paper should be held at about 45 degrees, with the first two fingers over the edge which is to be taken away. Sand lightly at first so that you can sense the proper pressure to take away the wood desired. Always stop sanding a little before you believe the operation is completed, for if a part is sanded too much it may be spoiled; material can be taken off but never put back. After using coarse sandpaper, smooth down the surfaces with a fine grade.

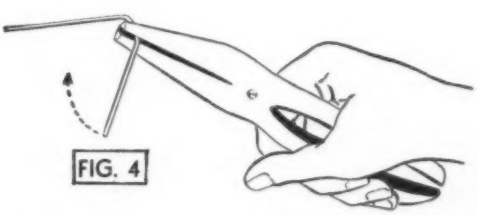
In the third operation, where two parts

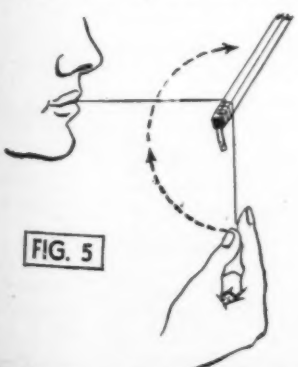
(Continued on page 32)

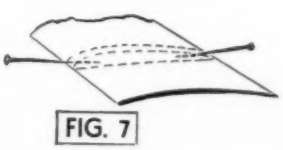


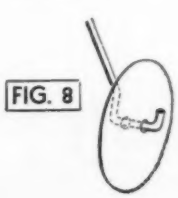


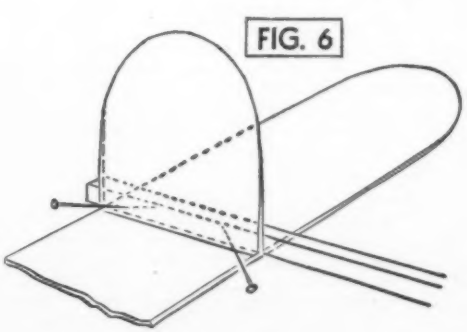












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Academy of Model Aeronautics

A Division of the National Aeronautic Association

OFFICIAL MODEL AIRPLANE NEWS

Model Plane Builders Gather at First Annual Conference. Dick Everett Wins Conference Trophy

(Hampton Bureau)

THE first annual planning Conference of the Virginia Model Association was recently held in Hampton, with 100 representatives of the various model associations connected with the Virginia group in attendance.

A feature of the Conference was an indoor contest at the Armstrong school auditorium, conducted under the rules of the Academy of Model Aeronautics. The Conference Championship went to Dick Everett of Hampton who garnered a total of 240 points. He was presented a trophy by Herbert K. Weiss, chairman of the meeting.

Respective winners of the contest were: Class A, R.O.G.: Dick Everett, Henry Lee, Caldwell Johnson. Class B and C, H.L.: Hewitt Phillips, Dick Everett, Caldwell Johnson. Class Three, B and C Cabin, R.O.G.: Leonard Purdy, Dick Everett.

Following the indoor contest a banquet was held at Cutler's restaurant. Featured speaker was Major Malcolm N. Stewart of Langley Field, whose topic was "Adventure in Aviation."

The welcoming address at the banquet session was delivered by Charles A. Hulcher, president of the Virginia Model Association. The keynote speaker was Edward R. Sharp, construction administrator, NACA. Frank Zaic, world traveler and aeromodeling expert, also spoke.

The entertainment program included vocal selections by the Prop Shop quartet, made up of Harry Shoaf, Caldwell C. Johnson, John Breich and Frank Dies. William F. Martins, magician, also performed. Concluding the session was the showing of color motion pictures of the Virginia Model Association State Meet held at Norfolk.

A technical session followed at the Hampton City Hall. Chairman for this meeting was H. K. Weiss, mechanical engineer, Ft. Monroe, and the speakers included E. N. Jacobs, NACA aeronautical engineer, on "Airfoils at Low Speeds"; W. F. Lindsey, aeronautical engineer, on "Gas Model Performance"; W. H. Phillips, aeronautical engineer, on "Tests on Model Gas Engines"; and Bruno P. Marchi, chairman of the contest committee of the Academy of Model Aeronautics, on "Aeronautical Experiments for All Model Clubs."

Concluding the all-day gathering was a conference in the city hall. Speakers were C. A. Hulcher, on "A Review of the Virginia Model Association"; Albert L. Lewis, secretary of the Academy of Model Aeronautics, on "The Academy and the Democratic Way"; Philip Pepoon, aeronautical engineer, on "The Ratio System in Large Contests"; and H. K. Weiss, vice-president of the Hampton Roads Model Association, on "Requirements of a Large Model Association."

The contest directors were Herbert K. Weiss, Charles A. Hulcher and C. Norman Purdy.

Hopkins' 12th Annual Meet

"The enclosed money order is for the A.M.A. Contest Director's Manual. If it contains only one good new idea, it should

(Continued on page 45)

LIFTING OR NON-LIFTING TAIL?

By GEORGE H. TWEENY

FOR the past two years it has been almost universal practice among the model building fraternity to use a lifting tail on all types of models, both indoor and outdoor. There is no question as to the superiority of this type of tail over all others, but how many builders fully understand the simple theories and aerodynamics underlying this so obvious superiority? Suppose we delve into the problem for a few minutes and investigate the actions of the horizontal tail.

There are, obviously, only three different types of horizontal tails: One which produces lift in an upward direction, one which has a resultant force acting in a downward direction and one which has neither an upward nor a downward force; a neutral tail. Each of these types is shown in the diagrams and will be discussed in turn.

Figure 1 shows the reactions caused by a lifting tail. The lifting stabilizer is cambered on the upper side exactly the same as an airfoil or wing section and produces an upward lift or force, which is shown as F' on the diagram. This force in turn produces a moment about the center of gravity of the model which acts in the opposite direction to the moment produced by the center of lift located ahead of the center of gravity. These two moments are equal in magnitude and act in a manner opposite to each other, so that the net result is zero. Thus the two effects exactly balance one another. This is clearly shown in the diagram.

Now what is the immediate effect of lifting tail on the model's balance characteristics? First of all, it is a well-understood fact that in order to have a model fly at its best efficiency, or its best Lift/Drag ratio, the wing should be located as far forward as possible. The action of the lifting stabilizer in always trying to raise the tail has the effect of constantly lowering the nose of the model, which necessitates placing the wing further forward to balance this effect. This fact is clearly illustrated by glancing at some of the recent designs of indoor endurance ships. It would

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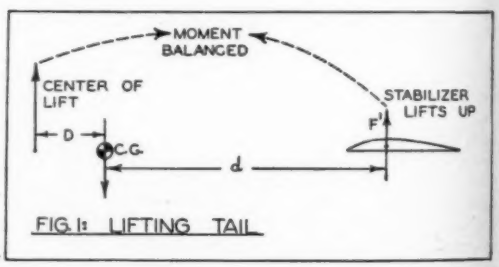


FIG. 1: LIFTING TAIL

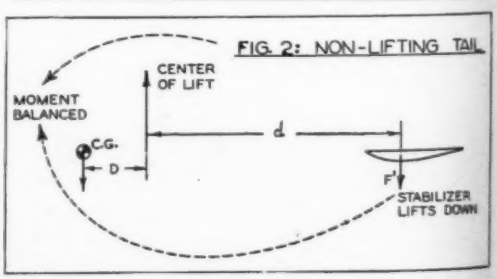


FIG. 2: NON-LIFTING TAIL

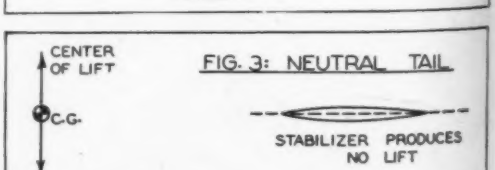
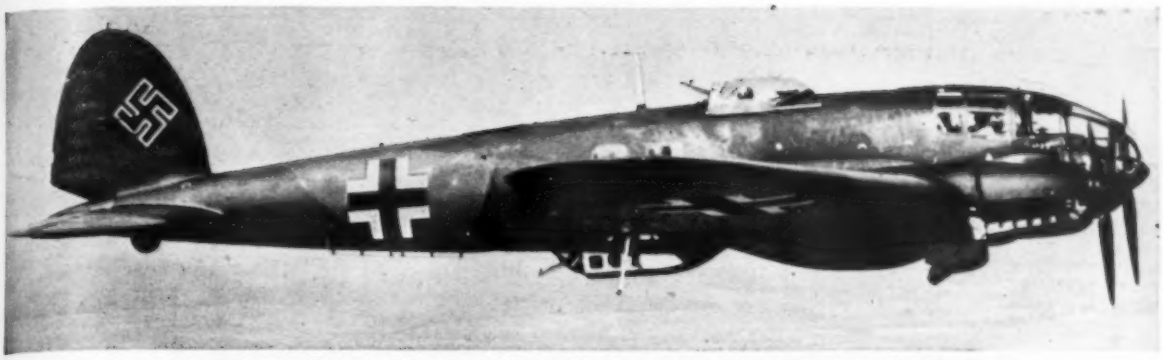


FIG. 3: NEUTRAL TAIL

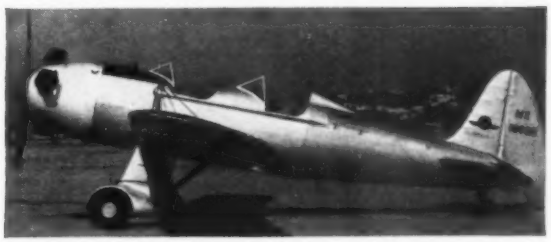


A Heinkel "Jager" He-113, latest type German bomber on its way to bomb England. (Acme)

FRONTIERS

Highlights of the Latest Developments in Aviation

By ROBERT C. MORRISON



The new Kinner-powered Ryan ST-3 army trainer

ALL RIGHT, the question has finally arrived: "Why don't we build 100,000 airplanes instead of 50,000?" We have been waiting for this obvious question for a long while and now the time has come. When we once establish our industry so it will be able to produce 100,000 airplanes the cry will more than likely be for 200,000! Be that as it may, but now that the production of 50,000 airplanes in the near future is inevitable, U. S. Air Corps officials and industry heads are seriously talking, among themselves, that that number should be doubled.

It all appears fantastic at first glance. The trouble is that no one has ever seen 100,000 airplanes in one bunch (or ever will for some time to come), and it is too expensive a picture for the normal human to coagulate among his or her gray matter without undue strain. Such is already the case with the automobile today, yet it is a fact that there are automobiles in this country many, many times surpassing the hundred thousand mark. It is still just as difficult for one to realize the true expanse of the Atlantic or Pacific Oceans until one has tried to paddle across. Many persons would be startled to know that there are as many as 45,000 whales, some weighing over 100 tons, killed each year in the Antarctic. Thus, even though some figures are startling, they are still facts.

For a country that intends to supply Great Britain with a good portion of her fighting planes, fulfill promises of protection to South America and still protect its own citizens, the U. S. A. is far from the productive output that it should be—that of 100,000 planes per year. That hundred thousand figure appears bewildering every time we look at it, but it is not as difficult as it might

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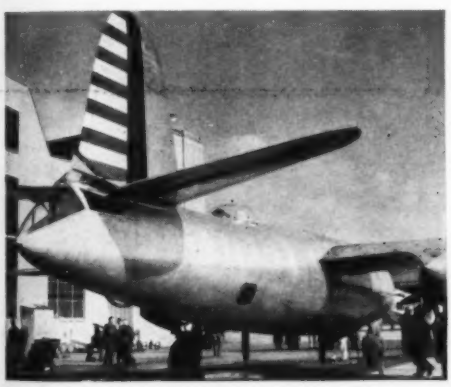
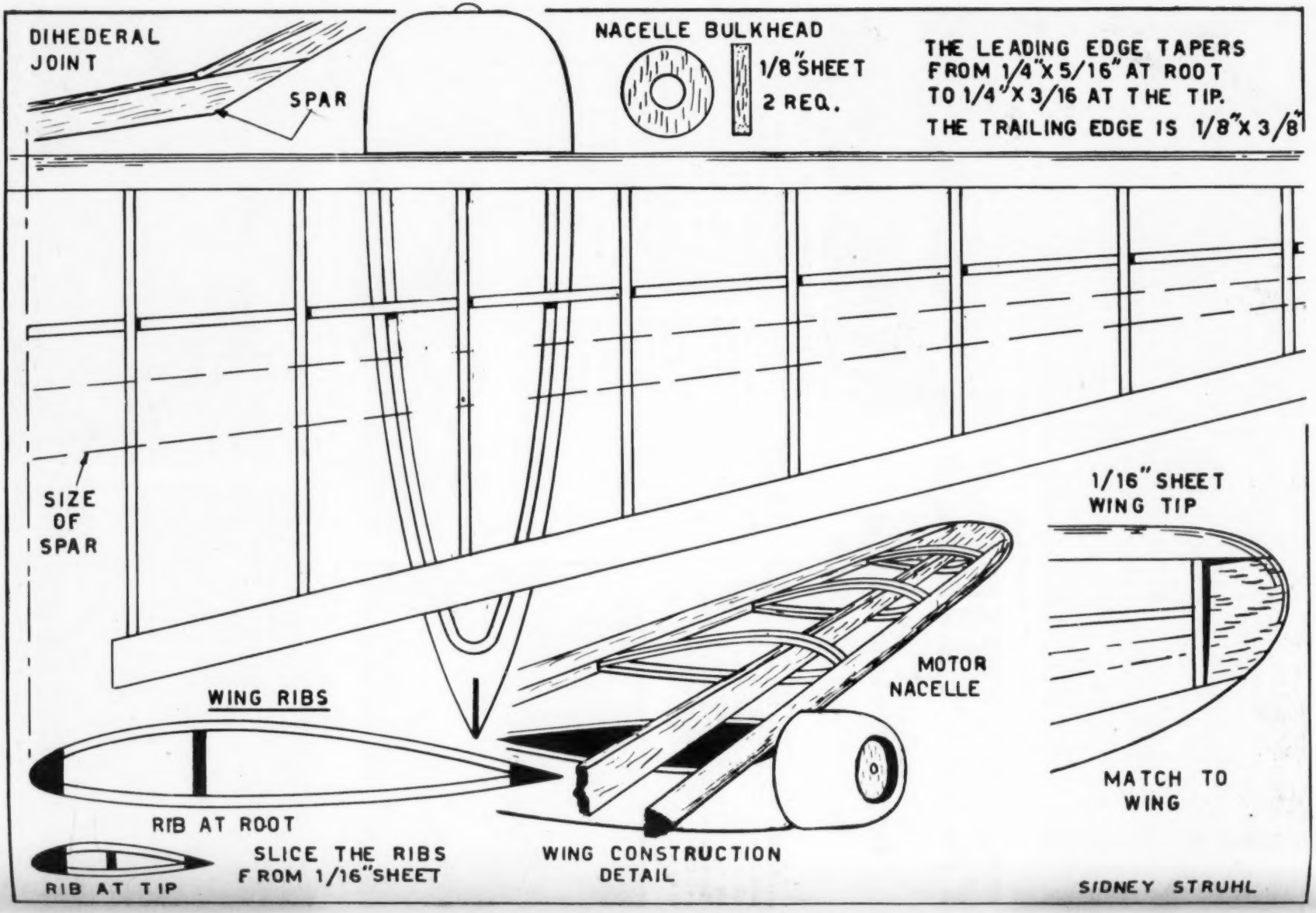


Tail of the Martin B-26 showing the rear gunner's turret containing latest combat equipment. (Acme)

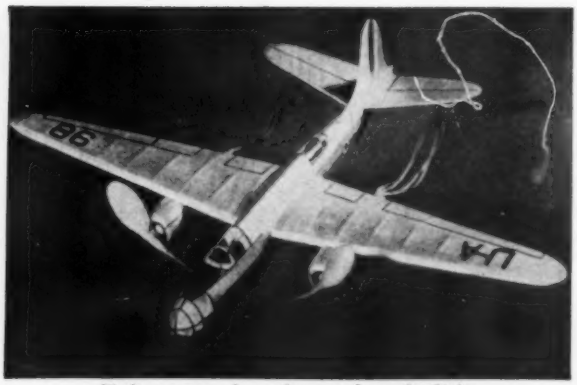
The new Republic YP-43 high-speed pursuit plane, one of the fastest fighting planes in this country

Flying fortresses in course of production on the final assembly floor of the Boeing factory; one every four days. (Globe)

Lockheed "Hudsons" rolling off the production line for final adjustments before being shipped or flown to England


DIHEDERAL JOINT
SPAR
NACELLE BULKHEAD
1/8" SHEET
2 REQ.
THE LEADING EDGE TAPERS FROM 1/4"X 5/16" AT ROOT TO 1/4"X 3/16 AT THE TIP.
THE TRAILING EDGE IS 1/8"X 3/8"
SIZE OF SPAR
WING RIBS
MOTOR NACELLE
1/16" SHEET WING TIP
MATCH TO WING
RIB AT ROOT
RIB AT TIP
SLICE THE RIBS FROM 1/16" SHEET
WING CONSTRUCTION DETAIL
SIDNEY STRUHL

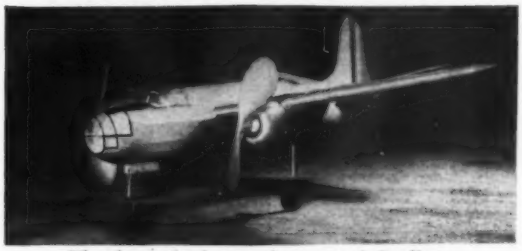
A fine flyer; just like the full-size plane



Twin motors give a long and steady flight

A Flying Twin Motor DOUGLAS DB-7

A Realistic Model Bomber. This Is Easy to Build and Fly



The three-wheel gear gives smooth landings

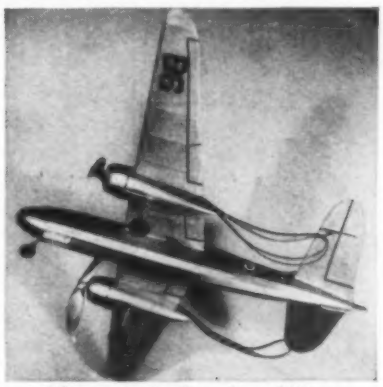
By SIDNEY STRUHL

WE ARE presenting this month, as our flying scale feature, the startling new Douglas Attack Bomber DB-7. The Douglas DB-7 is a twin-engined all metal monoplane high speed attack bomber, with many advanced design features incorporated into it; such as dihedral in the stabilizer and tricycle landing gear.

The model in full flight

This plane was originally designed and manufactured for the French Government. However, due to the terrible and swift "blitzkrieg" of the Nazis, France capitulated in a very short time, and very few ever got to France. At present production is going ahead on schedule on the original French order, but the purchaser is not France but Great Britain. This is borne out by the fact that Douglas DB-7's are arriving at Floyd Bennett Field for shipment to England, by way of tramp steamer. The Douglas DB-7 is called the "Boston Bomber" by the British.

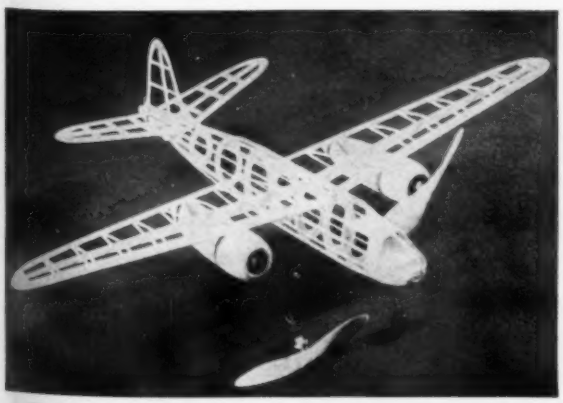
Power is supplied by two Pratt & Whitney SGR-1830-SC3-G "Twin Wasp Seniors" developing 660 horsepower for cruising, 910 horsepower for climbing and 1065 horsepower for take-off. The motors drive Hamilton Standard Full Feathering Automatic Controllable Pitch propellers of 12 feet diameter.



The motors hook to the stabilizer

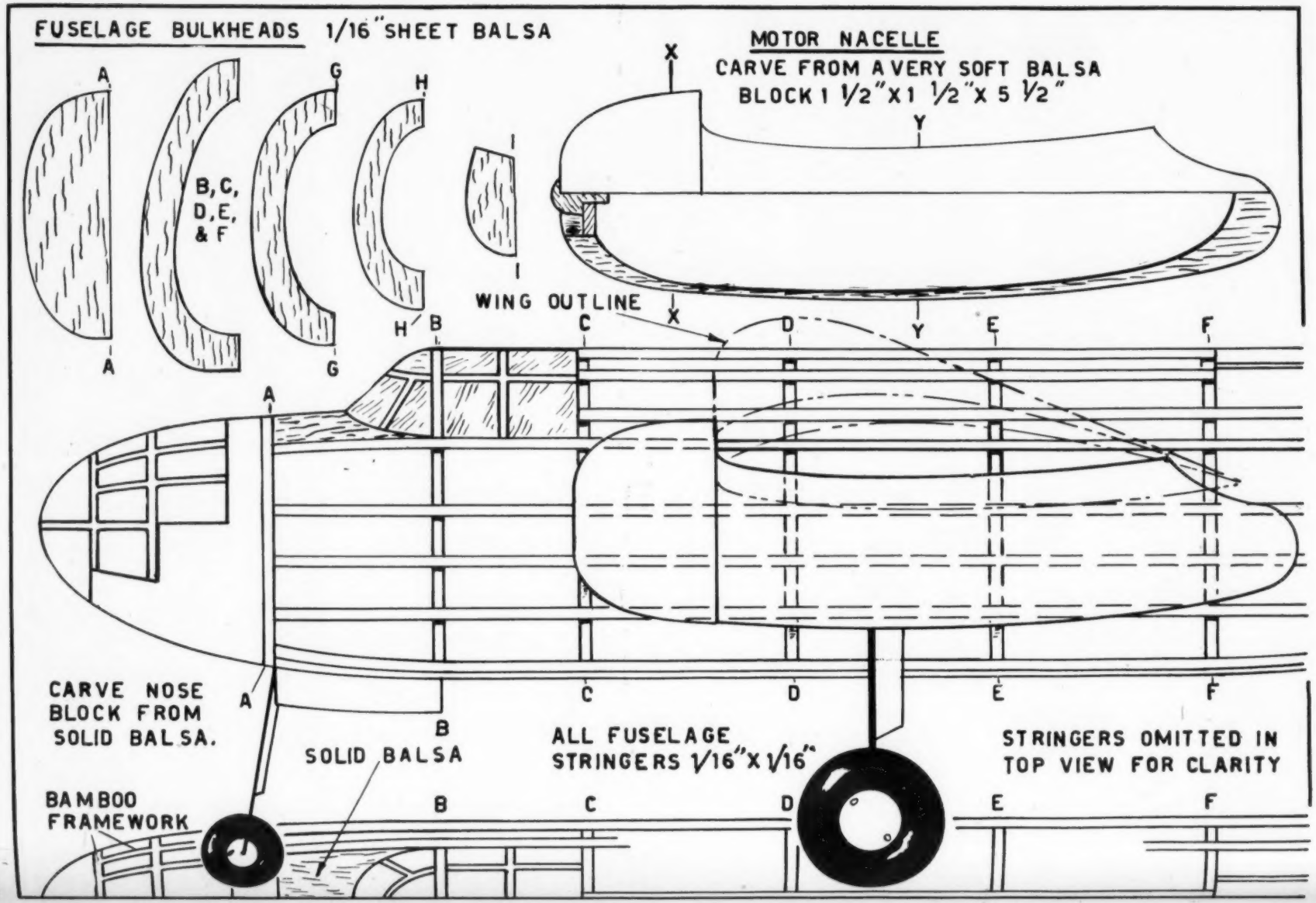
The DB-7 has a wing spread of 61 feet, 4 inches and is 46 feet long. Gross weight is 16,280 pounds. 2350 pounds of bombs may be carried. The top speed is 349 miles per hour and the cruising speed is 312 miles

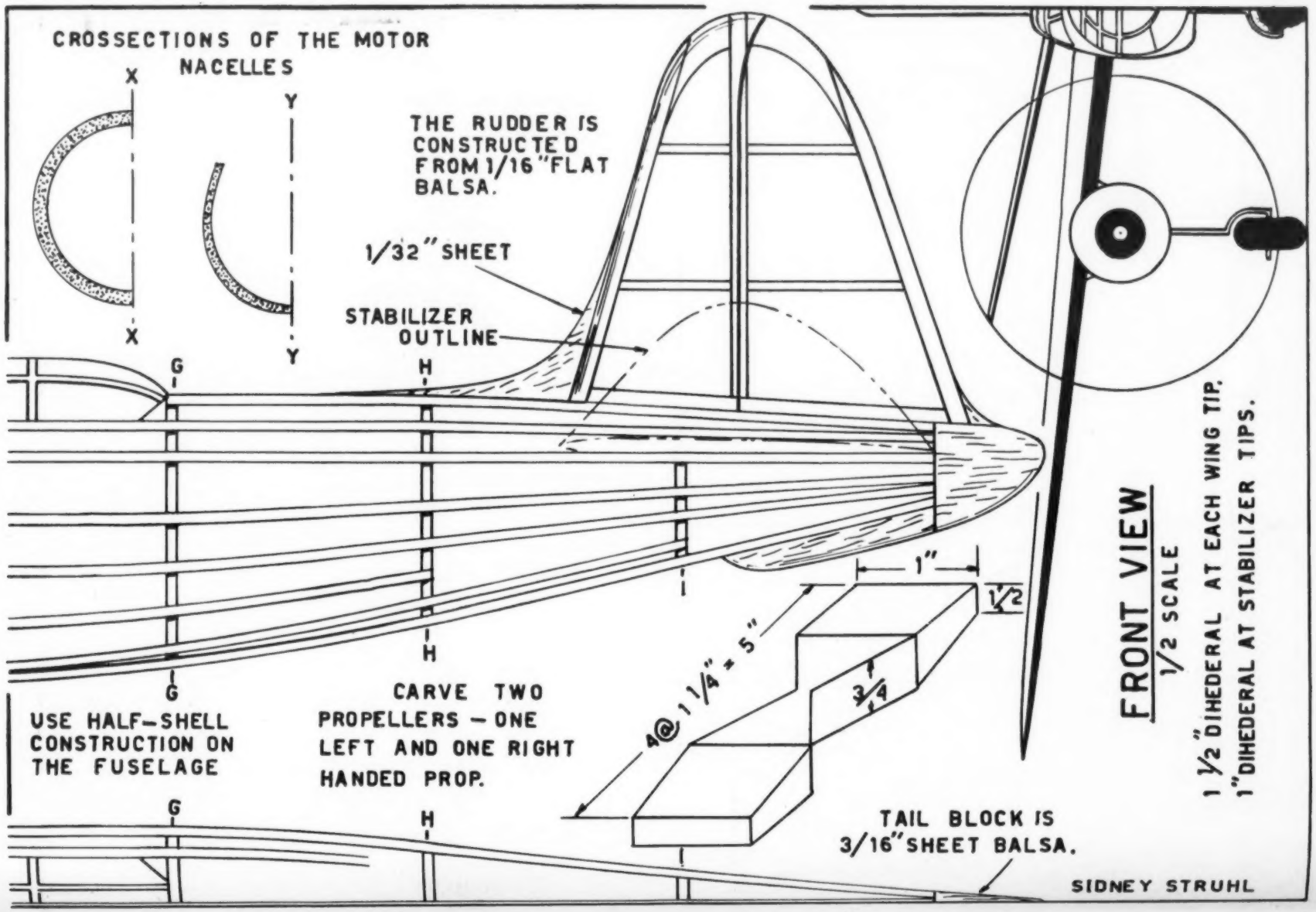
(Continued on page 41)



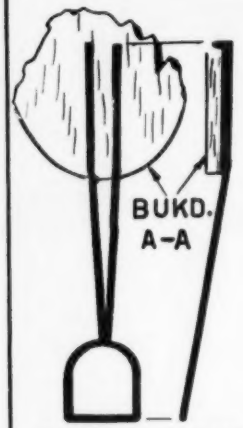
The frame is simple but sturdy. Propellers are removable

The motor nacelles are easily detached


FUSELAGE BULKHEADS 1/16" SHEET BALSA
A
A
B, C, D, E, & F
G
G
H
H
I
I
MOTOR NACELLE
CARVE FROM A VERY SOFT BALSA BLOCK 1 1/2" X 1 1/2" X 5 1/2"
X
Y
WING OUTLINE
B
C
D
E
F
CARVE NOSE BLOCK FROM SOLID BALSA.
SOLID BALSA
BAMBOO FRAMEWORK
ALL FUSELAGE STRINGERS 1/16" X 1/16"
STRINGERS OMITTED IN TOP VIEW FOR CLARITY

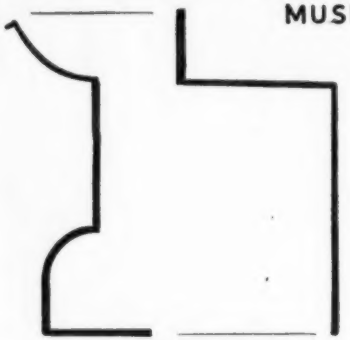

CROSSECTIONS OF THE MOTOR NACELLES
X
X
Y
Y
THE RUDDER IS CONSTRUCTED FROM 1/16" FLAT BALSA.
1/32" SHEET
STABILIZER OUTLINE
G
H
G
H
USE HALF-SHELL CONSTRUCTION ON THE FUSELAGE
CARVE TWO PROPELLERS — ONE LEFT AND ONE RIGHT HANDED PROP.
1"
1 1/2
4@ 1 1/4" = 5"
3/4
G
H
TAIL BLOCK IS 3/16" SHEET BALSA.
SIDNEY STRUHL
FRONT VIEW
1/2 SCALE
1 1/2" DIHEDERAL AT EACH WING TIP.
1" DIHEDERAL AT STABILIZER TIPS.

LANDING GEAR

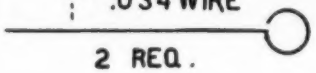


FRONT STRUT
1 REQ.

BEND ALL LANDING GEAR STRUTS FROM .038 MUSIC WIRE

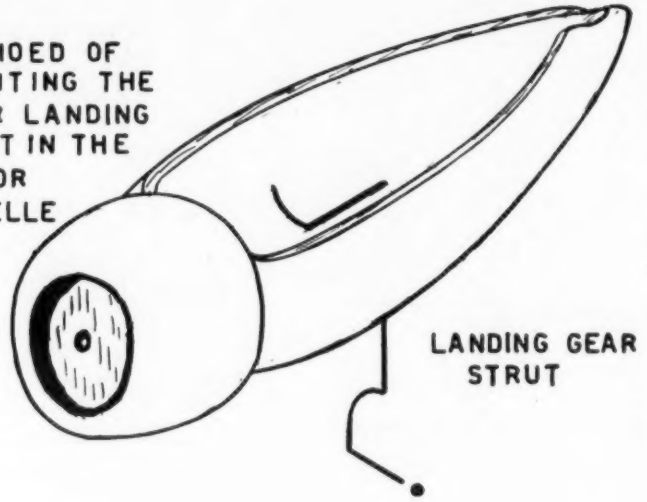


REAR STRUT
2 REQ.

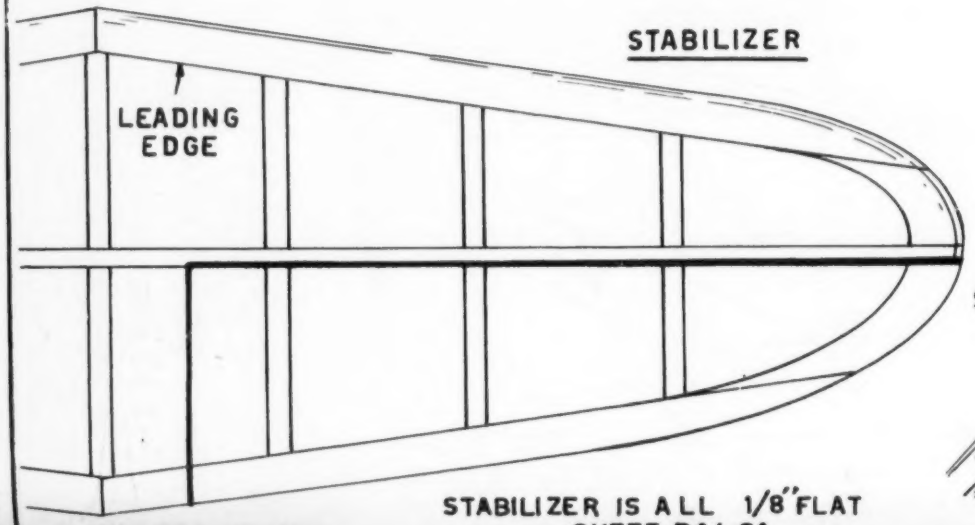


2 REQ.

METHOED OF MOUNTING THE REAR LANDING STRUT IN THE MOTOR NACELLE

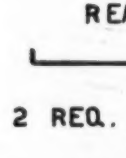


STABILIZER



STABILIZER IS ALL 1/8" FLAT SHEET BALSA

REAR HOOK



SIDNEY STRUHL

SIDNEY STRUHL
REAR HOOK
SHEET BALSA
1941

The Fairey "Fulmar," latest fighter of the British Navy. Though very fast, it can land easily on the deck of a carrier and already has won many victories

FLASH-NEWS

Special To Model Airplane News:

U. S. ARMY.—Latest power plant under development at Wright Field, U. S. Army Air Corps Material Division is the Myers jet impulse reaction design. Perfected by E. B. Myers, 50-year-old New York City inventor, weighs 148 pounds, is 10 inches in diameter and 48 inches long. The use of a special fuel composed of a mixture of carbon disulphate and nitrous oxide (the ingredients used in T.N.T.) causes cyclic explosions controlled by a valve. The motors would be mounted in the trailing edge of the wings of fighters and bombers as auxiliary power plants in addition to the main source of power and would be used for fast take-off and accelerations while in the air.

Awarded to the Pioneer Parachute Company an order for 6500 parachutes, the largest order for aerial life-savers ever placed.

Awarded to the Allison Engineering Division of General Motors an order for 4,150 liquid-cooled 1,000 horsepower engines at a cost of $69,722,000.

Awarded to the Republic Aviation Corporation of Farmingdale, Long Island, $5,210,513 for plant expansion and additional facilities for the production of YP-44 "Lancer" single-seat pursuit planes.

Development work on aerial cannon, speeded by reports from Europe, is progressing at Wright Field. A new type shell which can be exploded by heavy rain, so sensitive is its nose fuse, has been developed. Thus, a part of the plane engine or framework need not be hit for explosion to take place, as now necessary, for the new shell will explode when passing through fabric used on tail surfaces. Development work on the 20 millimeter and 37 millimeter aerial cannons installed on the Bell "Airacobra" P-39A single-seat fighter has been pronounced highly satisfactory. Using floating targets the tests were conducted over Lake Michigan. A special adaption of the famed French 75 millimeter, largest and most powerful aerial cannon in existence, is

(Continued on page 69)

AIR YOUTH OF AMERICA

News of Importance to Modelers

THE increasing number of veteran model builders who are being given jobs in some phase of the national aviation program is the outstanding new development in junior aviation activity, according to many reports received at Air Youth headquarters.

There is scarcely a large aircraft production plant in the country that does not employ one or more expert model builders on its staff, a recent check-up has shown. At the governmental aviation research laboratories at Langley Field more than 200 model builders are working, including such well-known figures as Dick Everett. Al Ortoff and Nick Limber, two model builders whose drawings and plans are familiar to readers of this magazine, is another pair of modelers who have graduated to full scale aviation, being employed in the drafting room of one of the important aviation companies.

Building five A. Y. A. models for aviation training

In discussing the value of experiences as a model builder in getting a job in the industry, Dr. George W. Lewis, Director of the National Advisory Committee for Aeronautics, writes in the preface to the new Air Youth handbook "Building and Flying Model Airplanes" as follows: "In the field of model aviation, the youth finds not only a recreational adventure but the open door to a life's work. Model flying has, in itself, instructive and sporting aspects of more than ordinary allurement. The opportunity to meet his fellows in the field trials of model aircraft is sufficiently challenging to bring out in the model builder all that is competitive in youthful nature, serving to inspire him to his best. The successful model builder is enabled, through his devotion to his hobby, to lay the foundation for a successful career in aeronautics or allied lines, whereby his inherent interest and skill as a model maker will lead more readily to the mature skill of a mechanic, pilot, or designer."

(Continued on page 63)

Model Designing Simplified

(Continued from page 23)

are cemented together, both contacting surfaces being covered with adhesive. For example, when attaching a rib to a wing, as shown in figure No. 3, cover the top of it with cement and also rub some cement on the under surface of the wing where the rib is to be located. Then press the two parts together tightly, brushing away the surplus cement around the rib with your finger. A little should be left in all the crevices. This will make the joint considerably stronger.

When parts are glued together it is suggested that, while drying, they be held in place with pins properly inserted to keep the joint tight. Figure No. 7 shows pins stuck into the rear and front of the wing and rib. When inserted at an angle the wing sheet will not pull away from the top of the rib; the pull due to the spring of wood being at an angle to the pin and not parallel to it.

Number four, bending wire, is the most difficult operation to master and the modeler should have considerable practice before attempting to shape the plane's various wire parts. To make a right angle bend as shown in figure No. 4, hold the wire between pliers in the right hand, then bend down the loose end of the wire in the direction shown. The closer to the pliers you apply pressure on the wire, the sharper will be the radius or angle of bend. A twist of the wrist of the right hand, when bending down the loose end, will help completion of the operation. To curve a piece of wire, hold the wire in the left hand and with pliers in the right make slight successive bends in the arc of the curve. The sharper you wish the curve, the closer to the nose of the pliers the wire should be held and the greater each successive bend should be. One has to acquire the "feel" of doing these things which comes only through practice; words cannot adequately describe it. To understand an operation is one thing; to do it is another.

Number five is a rather tricky operation and sometimes baffles those whose fingers are not agile. It involves holding the parts in their proper position while binding them together with thread. Figure No. 5 shows the operation of binding the bearing to the motor stick. One end of the thread is held between the teeth, the assembly of parts in the left hand; then with the right hand the thread is wound around the parts in the proper manner. To make such a joint it is always well to smear the parts with cement before and after winding.

Many builders will be inspired through their enthusiasm to "dive into" the building of their plane, whether or not they are skilled in all these operations. Though it may appear tedious and possibly irrelevant, we suggest you try each one before undertaking the plane's construction.

The first step in actual building is to make full scale patterns for the various parts: The wing, ribs, tail surfaces, stick, angle of incidence block, landing gear, tail skid, propeller shaft, "S" hook and propeller.

These, except the propeller block, are shown on the assembly drawing. They might also be called parts drawings. From a sheet of heavy paper the wing pattern should be cut to the measurements shown. Similar patterns may be cut for tail surfaces, stabilizer and fin. For most accurate results, rib patterns should consist of a metal template, shaped to the correct size and curve of the rib in the drawing. No pattern need be made for the stick or angle of incidence block. (A pattern of brown paper should be made for the propeller blade to be shown next month in another drawing. This will be used later to give the propeller blade outline.) The full scale drawings of landing gear, tail skid, propeller shaft and "S" hook will serve as patterns. When the wire is being bent, the parts may be laid on the drawing to make certain that the angles of bend are correct.

Making the Parts

Now you are ready to make the parts. From a sheet of 1/16" balsa cut out the wing and round the ends according to the pattern, figure No. 1. The edges of the curves may be smoothed with sandpaper. Next round down the upper edges of the wing sheet as shown in figure No. 2. The leading, or front edge, of the wing should be well rounded, but the trailing edge should be sharper. The cross section of the wing sheet, with correctly shaped leading and trailing edges, is shown in figure No. 3-A. The upper edges of the wing ends should be sanded similar to the leading and trailing edges.

Next, mark the center point of the wing and draw a line through it perpendicular to the leading and trailing edges; cut the wing in half along this line.

You are now ready for the second step —making the ribs. Mark off six, using the template described as a pattern. With a pencil trace around it on a sheet of 1/8" balsa. Cut these out in a manner similar to that used in rounding the wing tips (figure No. 1). Smooth down the surfaces so the ribs are of correct shape; however, be careful not to round down the edges of the side to be glued to the wing. When the ribs are completed glue them in place, as indicated by the dotted lines in the pattern. The center ribs should be flush with the straight wing-center-edge of each pinion, for later the two pinions are to be glued together at this point. When gluing in each rib perform the operation as described previously, inserting pins as shown in figure No. 7. If you prefer, clamps may be used to hold the wing sheet's leading and trailing edges tightly to the rib.

While this is drying, tail surfaces may be cut from 1/32" to 3/64" balsa in a manner similar to the wing, figure No. 1. The span and chord should be laid out on the balsa and the oblong sheet cut out. Then the ends may be rounded.

The edges and surfaces of fin and stabilizer should be smoothed with fine sandpaper to help keep resistance to a minimum when the plane is in flight.

Next shape the motor stick from a piece of medium-hard or hard balsa, 1/4" x 5/16" deep. The rear part of this, from a point 10" from the front, is bevelled down from 5/16" to 1/4"; the bevel, as shown, is 5-1/2" long. The stick, from the bevel, should be 1/4" deep rearward to the end; a distance of 2-5/8". Thus the total length of the stick would be 18-1/8". The extra 1/8" will "stick out" behind the stabilizer's trailing edge. The bevel may be made with a knife; first, however, draw a pencil line along the side of the stick, indicating the bevel. This may be used as a guide line for cutting.

Now the elevation block parts may be made; there are three of them. First, the incidence block, which is a wedge-shaped piece of medium-hard balsa 1/4" wide, 1/8" in the front and tapering to a knife-edge at the rear. This is shown double cross-hatched on the drawing of the elevator block and is marked Incidence Block. The other two parts are the Block Sides, the pattern of which is shown single cross-hatched. These are made of hard balsa 1/16" thick, grain running lengthwise. According to the outline shown, cut two of these from balsa sheet. When assembled, the incidence block should be cemented between them (as indicated by the dotted lines); that is, one block side cemented to each side. Pins may be inserted to hold the parts together while drying. Insert them at an angle, as explained previously.

Having completed all the wooden parts, you may undertake the shaping of the propeller shaft, tail skid and landing gear. All of these should be made from 1/32" steel wire. Start with the tail skid, as this includes the simplest operations. Shape it, using the technique explained, to the form shown on the drawing. Similarly, and according to dimensions, make the propeller shaft, landing gear and "S" hook. During the bending process lay them over the patterns to make sure they correspond to them in respect to shape.

The bearing may be purchased from any model-supply house; however, if you wish to make one it may be done from 1/2-round 3/32" steel strip, or metal 3/32" x 3/64" cross section. If available, an old corset steel may be used. This should be annealed or heated in a flame to reduce the temper. Then, after bending to proper shape and drilling the shaft hole, the whole part should be heated again to a dull-red glow and immersed in linseed, lubricating or a similar oil.

All parts except the propeller have been completed and the plane is now ready to be assembled. How this may be done and the propeller made, will be taken up in the next article.

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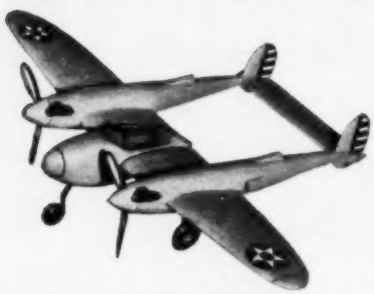

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Thousands of War Birds

(Continued from page 8)

training at civilian flying schools in primary flight instruction, ten weeks basic training, ten weeks advanced training and five weeks specialized training in combat type aircraft. The primary training is at one of the nine civilian schools. The basic training at either Randolph Field, Maxwell Field or Moffett Field, and advanced training is centered at Kelly Field in San Antonio. Then the cadet will get specialized training with one of the air corps tactical units.

A school for pursuit instructors has been established at Barksdale Field, as well as one for navigators and bombardiers at the same station. An additional school for pursuit pilots will be opened later.

The class which entered the civilian primary schools on August 3, 1940 will complete its training at the three training centers in April, 1941, with an estimated 475 graduating as military pilots. Every five weeks thereafter classes will graduate, gradually increasing in size until the peak of 685 pilots is reached in August of 1941. The class which entered the civilian primary schools in May, 1940 was increased from 396 to 466. Classes entered thereafter had the following strengths:

June, 1940	650
August, 1940	900
September, 1940	1100
October, 1940	1234
November, 1940	1292

Ground school instructors in primary schools were increased from a total of 20 to approximately 100; flying instructors in these schools were increased from 135 to 430. Flying instructors in basic and advanced flying schools were increased from 240 to approximately 1,000. The employment of approximately 60 civilian navigation instructors was accomplished.

This is the air corps expansion program as it stands to date. It must be understood that this has but one primary reason behind it—to train young men for the air corps. The applicant must agree to sign articles to serve three years, one as a Flying Cadet and two as a Second Lieutenant in the U. S. Air Corps reserve or on active duty in the army air service.

All of this, too, is a direct result of the war abroad; a lesson well-learned from the demonstrations of the Nazi Air Force. Because there is talk of invasion on our shores by potential enemies, Uncle Sam is preparing to build an air force second to none. These figures reveal plans for building that air force with superior planes and superior pilots. Because of this, the applicant who seeks air training for the air corps finds himself in the army. But don't let that scare you, for in time of war or even during a state of national emergency, that's the smartest place to be.

At the time a prospective student makes his application he must be a single male citizen between the ages of twenty and twenty-six. He must have completed at least two years of study at a recognized college or university or be able to pass an examination covering such subjects as are taught in these institutions. And he must also be of sound physique and in excellent health.

Should you desire to apply for this training and believe you can fulfill these general and specific requirements, you can get all the necessary papers from the commanding general of your corps area. After you get these proper papers, the application is then sent to the War Department in Washington and if it is approved the applicant will be notified when and where to report for examination. It may be any city or air station where there is a registered government flight surgeon. Uncle Sam is generous and pays your expenses.

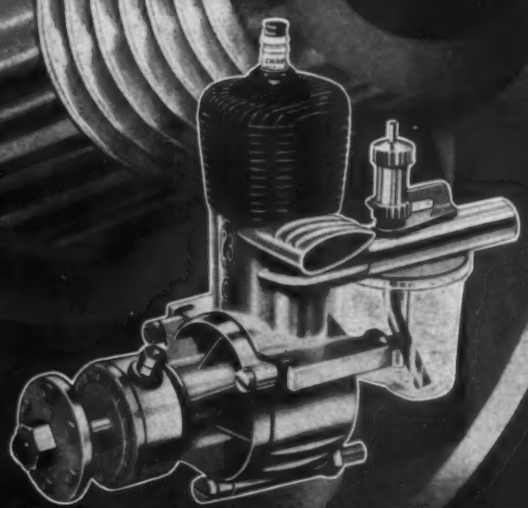
Passing the examination is a big assignment. It consists of four parts: physical, moral character, general fitness and educational. The physical examination is to select the physically normal applicants and eliminate those with defects or disease which would become aggravated by flying training or which would increase the hazard of such training. This is a compulsory examination and it is the toughest physical examination in any division of the army service. The physical standard for flying is higher than that for enlistment in the regular army and the physical test given to the prospective cadet is much more difficult than that given those who wish to enlist in the regular army. In general, however, the physical defects which disqualify for enlistment in the regular army also disqualify for flying training; but there are others which will "wash out" the youngster who hopes to be a flyer.

If he passes the physical the cadet-aspirant must have perfect vision, requiring a 20/20 in each eye without correction. His teeth must be all his own and they must be in the prime of condition. Particular attention is paid to the balance of the ocular muscles. His hearing must be far above the average and the nasal passage must be free from any obstructions. Likewise, his equilibrium must be rated high and there can be no tendency to nervous or mental instability.

Should you not be one of those with a college education, then you must take a mental exam that requires you to know prominent persons and events connected with the origin, growth and government of the United States from the discovery of America to the present time. You need not be concerned with annals and dates, but you must have an intelligent insight into the "whys and wherefores" of American history. In English grammar and composition you must possess the ability to express ideas clearly on subjects of common knowledge. You must also be well-versed on the important facts which surround the history of ancient Greece and Rome and medieval Europe.

All that map study and those geography lessons you labored through in school will come in handy now, for one of the most important parts of the test is the knowledge of geography. The candidate must know geographically the principal land and water features and natural resources of the United States. He must know the general location of commercial routes, navigable rivers, principal centers of population and manufacturing, the political and racial boundaries and the natural products of various sections. This knowledge will prove a great aid in flight navigation problems that are to come.

Contact



Aviation's dictionary has been built around the word "Contact".

It means that somebody is about to give something the gun. It meant that the juice is on and grease monkeys had better stay away from the prop. It means "Stand Clear!" while a nonchalant man-made invention takes another crack at gravity.

The fully-enclosed Ohlsson timer (shown in this exposed section) is recognized by modelers as the most foolproof and dependable on the market.

The moving breaker-point, made of high carbon steel, is the lightest possible, as a heavy piece here would have too much inertia for high-speed operation. The light weight assures instant contact of the tungsten points to fully energize the coil field and deliver maximum spark intensity.

Easily and separately replaceable, the actuating spring forms an entirely distinct unit of clock steel.

The 10,000 R.P.M. offered by timers on other motors is child's play to an Ohlsson, which is capable of delivering up to 20,000 R.P.M. without flutter!

Imitated but not duplicated, this improved Ohlsson timing mechanism is another of an array of reasons why more modelers are now choosing Ohlssons than any other make. Visit your dealer now and

★ ★ ★

BE A THREE WAY CHAMPION

(Modeling's Yet-to-be-Achieved Goal)

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OHLSSON & RICE MANUFACTURING CO.

Ohlsson & Rice Mfg. Co.
P. O. Box 2324, Terminal Annex, Los Angeles, Calif.
Please send folder with specifications and data on all 3 Ohlsson Microsealed Motors.

Name .....

Address .....

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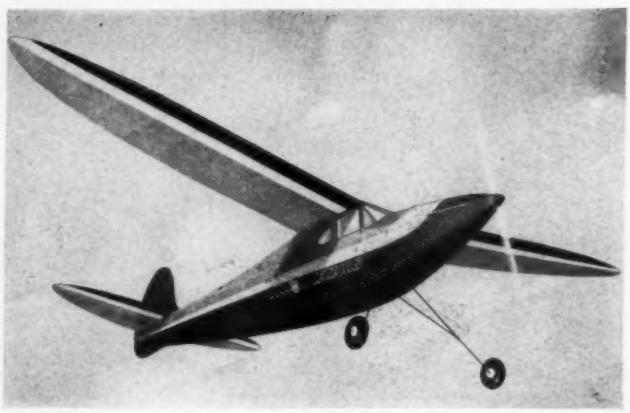
ALL AMERICAN



Come on, you patriotic young Americans—show your colors this Spring—build the "All American"! Thrill to its dashing, red, white and blue color scheme . . . its BIG 45" wingspan . . . its long, graceful endurance flights! Be the envy of every young fellow in your neighborhood! It's EASY to build, even for a beginner.

Complete kit, including detailed, full-size plan, postpaid or at your dealer..... **$1.00**

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to give YOU flying
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NEW 194
Chock full of
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plane kits
gas motors
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etc. Send

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50" W

For class "B"—here's the
performs them all! A
winner from coast to
streamlining has been
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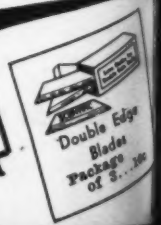
NEW No. 1
Scientific
GLIDER

NEW! Wing tapered! Rudder, stabilizer and fuselage cut to shape!

You'll never know how beautiful a glider can be, or how well a glider can perform until you've flown the NEW No. 1 Scientific GLIDER! Wingspan 20⅛". Length 18". Fly it this Spring! Complete kit, postpaid or at your dealer..... **25¢**



Double Edge Blades
Package of 5...10¢

Scientific's
WHIPPET

30" WINGSPAN

This contest type model is hard to beat when it comes to endurance! Features adjustable and detachable swept back wing, simple and efficient landing gear, twin rudders, simple and efficient landing gear. Rudders and wing red, fuselage and stabilizer white with red trim. Complete kit, postpaid or at your dealer..... **50¢**

SCIENTIFIC MODEL AIRP

"GAS MODEL HEADQU

218-220 MA-3 MARKET ST.,

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Your C ic's
W 194 OG
k full of
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car kits . . .
Send . . .
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Scientific's
YELLOWBIRD
30" WINGSPAN

Make your fellow contestants sit up and take notice this Spring . . . fly the "YELLOWBIRD"! Designed for consistent endurance flights, it employs the under chamber swept back wing—movable and detachable. Complete kit, postpaid or at your dealer..... **50¢**

Scientific's
PARACHUTE PLANE

. . . with automatic trap door release!

Imagine—after climbing several hundred feet, pilot and parachute drop out—automatically! Makes flights of a mile and more! 40" Wingspan. Complete kit, postpaid or at your dealer **$1.50**

Scientific's
SPEEDSTER

This speedy, graceful member of Scientific's "Flying Demon Squadron" is a consistent performer! Takes off from the ground within three feet! Parasol wing type, with open cockpit. Wing and tail surfaces red, fuselage white with red trim. 25" Wingspan. Complete kit, postpaid or at your dealer..... **25¢**

NEW!
Scientific's
DOUBLE DUTY KNIFE
10¢

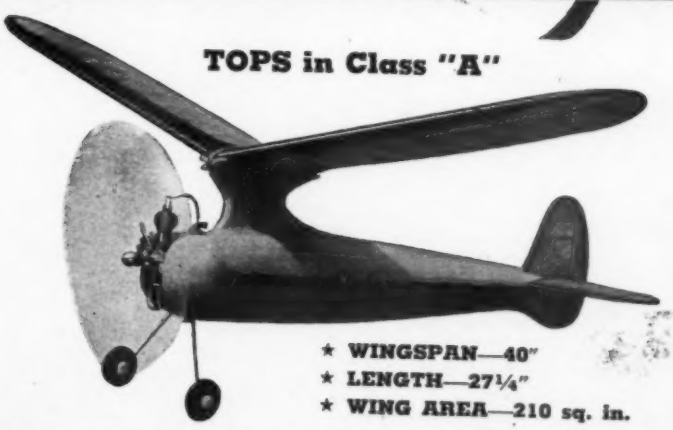
PAT. PENDING

The most practical knife ever developed for model building and all other crafts.

Nationally Acclaimed Champion! Scientific's

★Starling

TOPS in Class "A"



★ **WINGSPAN—40"**
★ **LENGTH—27¼"**
★ **WING AREA—210 sq. in.**

Whenever you hear the boys say "it's the classiest of the class A's", you can be certain that they're referring to the "Starling" . . . for the lines and beauty of this gas model job are exceeded only by its ability to perform. Incorporates many new features which are unusual in a plane at this low price.

Complete kit, including detailed, full-size plan, postpaid or at your dealer..... **$1.95**

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SPARK PLUG WRENCHES

Seamless steel tubing, finest obtainable. Punched with inside and *outside* dies. Cadmium plated to prevent rusting. Four sizes: Large for V Champion; Medium for Brown, Hurleman & Blue Crown; Small for V-2 and Extra Small for V-3. Medium size also fits propeller nut. Look for Junior Motors stamp on the product. Price only 20c.

COIL $1.75

J-M Spark Coil in shock-proof case, semi-closed magnetic core from Silicon transformer steel. Vacuum impregnated with wax of special die-electric strength.

CONDENSER 20c

200 Volts O.I.M.F.D. capacity. Light metal clad unit with combination mounting and ground connections.

BOOSTER BATTERY LEADS 30c

For connecting booster batteries to gas models. Two "U" clips for battery connections, and two Lucite plugs (Red and Black) for inserting into jacks on model.

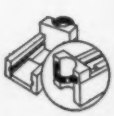
EXHAUST MANIFOLD

Easily attached to any Junior Motor, clip over exhaust ports. Keeps model free from oil, also excellent for cowling.

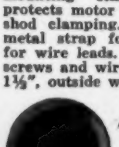
HIGH TENSION LEAD 15c

Finest stranded Belden Cord with high tension insulation and phosphorus bronze clips. Oil proof lacquered.

TEST BLOCK 35c



For running-in your motor, or for handy use when motor is not in model. Makes wiring and mounting simple, and protects motor from slipshod clamping. Special features include metal strap for mounting coil, grooves for wire leads. Complete with crankcase screws and wiring diagram. Inside width 1⅛", outside width 2¼".



FLYWHEEL $1.50

Machined from High Grade Alloy Steel, free from flaw or defects. Balanced and Cadmium plated to prevent rust. Weights: 7 oz., 11 oz., 14 oz., & 6½ oz. (Brownie)

STEEL CONNECTING ROD FOR MODEL D JUNIOR MOTORS $1.00

Drop forged one piece hy-grade special Alloy Steel.

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Philadelphia, Pa.

Please send me illustrated folder on the complete line of Junior Motors Accessories.

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Arithmetic, algebra and advanced mathematics are equally important since many of the flight problems connected with military aviation today require mathematical computation. This is especially true in reference to cross-country flights which take up the greater part of the student's time at the advanced flying school at Kelly Field. All of the subjects are covered in general text books which any prospective student can obtain at the library.

There is no favoritism in the army air corps, you just have to be good and prove it, but there is a preference list which allows certain individuals priority over others in line for the free flight training Uncle Sam offers. However, they have earned their right to it.

Graduates of the U. S. Military Academy at West Point, the Naval Academy at Annapolis or the U. S. Coast Guard Academy who apply for appointments as Flying Cadets within one year after their graduation date receive first recognition to fill the vacancies. Reason for this priority is based on the belief that these men who have had army training and have been in the service are entitled to first chance since they have already devoted themselves to army life.

Individuals who are fortunate enough to be accepted for flight training in the air corps are appointed "Flying Cadets." The Cadet receives $75 per month pay and is given $1 a day for his rations. He receives his uniforms and equipment without cost and his transportation from the point of enlistment to the flying school is paid by Uncle Sam.

Let's suppose you had all it takes to pass the primary requisites of physical exactness and mental aptitude; that you have received your appointment to learn to be an aviator for the army:

Within several days after receipt of the letter acknowledging your appointment you would probably be aboard a train enroute for the nearest primary training school, and you would most likely be stepping into a world heretofore unknown to you.

It would be a difficult task to put into words your feeling on this day, because the Flying Cadet sees himself stepping into a new and great industry—one that has unknown possibilities and which, like himself, is very young. He knows, too, that such men as Lindbergh, Hegenberger, Rickenbacker and many others have preceded him at the U. S. Army's air-training bases and have brought fame both to themselves and to the U. S. Army Air Corps, and he is proud to be chosen as a Flying Cadet.

Before him he has a big task. He must learn two primary things—to be an excellent pilot and to be a good soldier. In one year he must adapt his hands, feet and mind into a muscular and mental coordination necessary for the perfect control of an airplane. And he must also absorb the army's long tradition of service, honor, loyalty and discipline.

The training which he must undergo at this civilian school and later at Randolph Field and Kelly Field is divided into three separate departments—the Academic Department, the Flying Department and the Military Department. Each is of equal importance and all three are essential to insure his proper schooling.

In the Academic Division he studies subjects relative to an airplane, its parts and its flying qualities and characteristics. The Flying Branch teaches him the actual process of controlling that plane in the air and the Military Department prepares him for the duties of a regular army officer and officer in the Organized Reserves. The training he receives from this division brands him strictly "army" and he can never be changed, nor does he want to be.

The Military Division is his Personnel Department, for through it he contacts his fellow students for the first time. With these men he forms friendships which will never be broken. They are his room-mates, his flying partners and his "buddies" for life. Most of them are college graduates who come from all walks of life; they are the best products of American youth.

But, back to the individual—and it might be you.

When he arrives at the designated school he is met by instructors who introduce him to the secretary of the school where he must fill out his registration. It's just like your first day at high school or college.

From the registrar's office he goes to the Flying Cadet department headquarters where he ceases to be just an individual and becomes officially "Cadet So-and-So from Paducah." But to his instructor he is just a plain "dodo" trying to get his wings.

He reports to the Commandant of the Flying Cadets, a competent instructor who has been detailed by the army to handle the "dodos," and is assigned to a room and given his uniform and necessary equipment, which includes everything from shoe polish to brass buttons.

Then it actually begins: For two weeks he is put through military drills for the purpose of acquainting him with army mannerisms and regulations. He learns when and how to salute, how to handle his rifle and all the necessary training that goes with the making of a soldier. He goes through tireless hours of marching individually, in squads and in platoons, until he and his associates are as well drilled as any West Pointer. It's tough work, too, for he gets out of bed at 6:00 A.M. with reveille and turns in with taps at 9:30 P.M.

Although the requirements are not as strict at the civilian schools, the cadet gets a taste of what will come when he goes to Randolph Field, for there the day of a Flying Cadet is a long one. He rises at six in the morning and must have himself and his room in order for police inspection just before breakfast, which is served at 6:35. After breakfast he has until 7:40 to finish getting his quarters in order and to prepare for his morning work. Most of the morning is taken up by flying and ground instruction. After lunch he goes to school until three o'clock. Four afternoons a week he must take exercises for one hour between 3:15 and 4:15. This is to keep his physical fitness and consists of athletic drills and games. Supper is served promptly at 5:45 and from 7:00 until 9:00 he must remain in his quarters and study his lessons for the next day.

That is the routine at Randolph Field where he will go after he has finished his primary flight stage, and because the civilian instructors know what he must expect better than he does, the routine of living at the civilian schools are very much the same.

During his first week at the school the cadet goes through another physical examination and doctors take his blood pressure, test his heart, examine his ears, nose and throat, seeking to find the slightest indication of any defects in his physical nature. He looks into queer binocular attachments to test his eyes, and color designs spin before him to determine whether or not he is subject to color illusions. When this is done and surgeons pronounce him "O.K." then he is ready for contact with actual flight instruction.

However, before the student's time is devoted to actual flying, he must first spend much of it in the course of ground instruction. Although this appears to many people as being of minor importance, it is necessary to acquaint the student with the principles of flying. He sits long hours in class-rooms and listens to seasoned army officers demonstrate many of the intricacies which go with the flying of an airplane.

Actual experiments with airplane motors and various types of construction and design in the fuselage and wings of the plane make the course of great interest. He does not feel that his lessons are just something which must be accomplished, but he takes particular interest in working out the various problems. This requires excellent presentation of the necessary educational information and the army prides itself on the instructors who "dish it out;" many of them are themselves graduates of Kelly Field and they know their A-B-C's of aviation.

From this ground course the student learns the different types of military and commercial aircraft, the types of structure and the various materials used in the construction of the plane. He also is taught the branches of the air corps with their individual requirements. The lectures on rigging and structure are given in the hangars where the ribs, longerons, stabilizing devices, controls and many other structural details of an airplane can be seen on the plane itself.

After he is introduced to the parts and working principles of the plane it is essential that he know something about the power plant. The history of the airplane parallels, to a great degree, the development of the internal combustion engine, and even today one of the chief problems which confronts aeronautical engineers and designers is that surrounding the developments of an engine with sufficient power to give the desired performance to present-day planes. Thus, it is essentially important that the student, whose life's work is to be aviation, must possess a good understanding of the airplane engine.

He is taught the theory of operation, principles of carburation and ignition, fuel and lubrication requirements of the various engines in use today, during his months in the primary stage of training. On the many types of engines he goes "trouble shooting," which means he must take the motor apart and discover its defects—which are incorporated in its mechanism by skilled mechanics purposely so that the student will become accustomed to the little difficulties which sometimes cause engines to go "dead" and necessitate forced landings. When he is able to discover these faults and knows what to do to correct them, then his combined knowledge of airplane construction and design along with his understanding of the power plant makes him ready to fly from one destination to another. He is theoretically familiar with the physical side of flying.

At this point in his training he is acquainted with the importance of the map, which is a necessary part of his equipment. He will need to understand the many different types in order to carry out successful aerial navigation and he must be trained to use them and benefit by their information. Twelve hours of his military training are devoted to this study. He is taught the meaning of the conventional designs and marginal information that is contained on the special types of maps used for the various air corps problems.

Unlike the "barnstormer" of days gone by, who flew from town to town by following railroads and rivers, the flying cadet of today is faced with problems of navigation which require a great deal of technical knowledge. Air navigation has progressed along with the airplane into a complicated and intricate operation. Aerial maps, magnetic compasses, radio beams, wind calculators have come into existence, and the student must learn the principles of each before he can master the art of navigation with any amount of success. During this ground school training he is taught each of the various methods used, for he is to be no "fair weather" pilot. The army flies in good weather or bad, day or night, and the military pilot must always be master of his ship.

Speaking of weather, in order to teach the cadet something about atmospherical conditions a course in "Meteorology" is compulsory for all students. This course brings stress upon four phases which are important to the pilot. The first is a general outline of the meteorological elements—temperature, pressure, winds, clouds, precipitation and humidity, their causes and their effects on flying. Then come the sources of weather information and where they may be obtained. The importance of fog and clouds and the various types of storms and the dangers which they present

here's proof!

Elmer Powell, model builder of 279 Jackson Ave., Jersey City, N. J., tells us that he lost his Class "A" gas job, and, although subjected to wind, rain, and snow, it was found 4 months later with its Silkspan covering intact. Elmer says:

"This proves definitely that SILKSPAN has no equal. Many thanks for giving the model builders a covering that can be depended upon."

Whether your models are gas or rubber-powered, it pays to insist on SILKSPAN, the *American-made* Covering Paper. Don't weaken your model with unsatisfactory substitutes.

SILKSPAN

REG. U. S. PAT. OFF.

Why not write and tell us of your experiences with SILKSPAN?

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RANGER

FREE HALF PINT OF CEMENT ON ALL ORDERS OVER $1.75

18" BALSA STRIPS

1/16 sq. 100	5c
1/16x1/4 25	5c
1/16x3/16 19	5c
1/16x1/4 16	5c
3/32 sq. 31	5c
1/8 sq. 31	5c
1/8x1/4 10	5c
3/16 sq. 9	5c
1/4 sq. 6	5c
1/4x1/2 3	5c

18" BALSA SHEETS

1/64x2	10c
1/32x2	10c
1/16x2	10c
3/32x2	10c
1/4x2	10c
3/16x2	8c
1/2x2	9c
1/4x2	11c

3" and 36" cost twice 18"; 3x36, 3 times.

18" BALSA PLANKS

1/4x1/2 2	5c
1x1	5c
1x2	9c
2x2	16c

2x3	22c
2x6	38c
3x6	72c

3 FOOT BALSA

1/4x3/16 12	20c
1/4x1/4 10	20c
3/16 sq. 8	20c
1/4 sq. 6	20c
1/4x1/2 3	20c
3/8 sq. 2	20c
1/2 sq. 2	20c
Sheets, 4 times 18".	

PROP BLOCKS

1/2x3/4x5	7 5c
1/2x3/4x6	6 5c
3/4x1x8	3 5c
3/4x1 1/4x10	3 8c
3/4x1 1/4x12	3 9c
1x1 1/2x12	ea. 5c
1x1 1/2x15	ea. 6c

BAMBOO

1/16x1/4 Doz. 10c

REED

1/32 10 ft.	3c
1/16 8 ft.	3c
1/8 6 ft.	3c
1/4 3 ft.	3c

BROWN RUBBER

1/16 sq. 15ft.	5c
1/8 flat 15ft.	5c
3/16 flat 12ft.	5c

PROPELLERS

Balsa Paulo Gas wing Mod.

5 - 4c - 7c	-10 -25c
6 - 5c - 9c	-11 -25c
7 - 6c -12c	-12 -25c
8 - 7c -15c	-14 -35c
9 - 8c -16c	
10 - 9c -22c	
12 -10c -28c	
14 -12c-35c	
15 -15c -44c	
16 -16c -50c	
18 -25c -X	

CEMENT CLEAR DOPE AND THINNER

1/2 pint	25c
Pint	45c
Quart	80c

COLORED DOPE

1/2 pint	30c
Pint	55c
Quart	95c

CELLULOID

8x10 inches 10c

TISSUE AA

White doz.	15c
Colored doz.	19c

MODEL KNIFE

Steel Blade 10c

WHEELS PER PR.

Birch Colu.

1/2	1c—X
3/4	2c— 8c
1	3c— 7c
1 3/4	4c—10c
1 7/8	6—16c
2 1/2	X—X
3	X—14c

MUSIC WIRE

.014 6ft.	2c
.020 6ft.	3c
.028 6ft.	3c
.034 6ft.	4c
.040 6ft.	5c
.063 3ft.	5c
1/16" 5ft.	20c

PROP SHAFTS

Small 5 for	9c
Medium 4 for	3c
Large 3 for	3c

THRUST BEARINGS

Small 1/2 doz.	5c
Large 1/2 doz.	7c

ALUM. TUBE.

1/16	6c ft.
3/32, 1/8	7c ft.
3/16, 1/4	9c ft.

SHEET ALUM SQ. FT.

.003 10c .010 15c

GAS MODEL BILK

Best qual. 40c yd.

BAMBOO PAPER

White	5c
Colors 2 for	15c

SMITH COILS

1 3/4 oz. 1 1/2 V $3.00
21/2 oz.3V $2.75

AERO SUPER COIL

1 1/2 volt	$3.00
3 volt	$3.75

AUSTIN TIMER

P.P. on $1.25

CHAMPION PLUGS

5/8 or 1/2" 65c

WASHERS

1/2 or 3/16 O.D. Dozen 2c

GAS MOTORS

Ohlsson 19 $14.80
Ohlsson 23 $16.80
Ohlsson 60 21.80
Forster 17.80
Forster 29 B 18.80
O. K. Special 11.80
O. K. Twin 23.00
Ranger 16.75
Dennymight 18.85
Brown Jr. D 12.80
Brown Jr. B 21.80
Bantam 16.80
Synero Special 9.95

M. M. WHEELS PER PAIR

1 1/2, 1 1/2 & 1 3/4 50c
1 3/4, 2" 60c
Gas. Mod. 2 3/4 90c
3 1/4, $1.50; 3 1/2, $2.75; 4 1/2 $2.75; 6" $4.00.

ELECTRIC SOLDERING IRON

Each 40c

NOSE PLUGS

1/2, 5/8, 5c; 3/4, 6, 7/8; 1" 4, 5c.

ORDERING INSTRUCTIONS

Packing cost on all orders 10c, 36" or 5 ft. 20c. To packing cost add 10% for postage. Free packing and postage on all orders over $3.00.

RANGER MODEL SUPPLY CO., 388 14th St., BROOKLYN, NEW YORK

TIGER AERO MOTOR $16.50

FINEST FOR 'FIREBALLS'

TIGER-IZE your U-Control models for speed thrills!

To accomplish the regular, precision performance which characterizes aviation — to establish prestige as a model flyer — to be first in line for winning contest flights— you must have the best in engine performance. Peak performance with a Tiger is no secret. Read and heed, for these developments are of special significance.

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By

Bunch Engineering Staff

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TIGER PRESTIGE

WHEN you join the army of Tiger Aero engine owners you will find the original methods devised to get extra horsepower and stamina are as ingenious as they are practical. One look at a Tiger Aero engine and its excellence as a piece of precision machinery is evident.

The features of special importance—the talking points—about Tiger engines are not "dreamed up" advantages claimed to arise from insignificant details of construction.

The Tiger (alone in the field of model engines) achieves compression scientifically with the use of both piston rings *plus* lapped-in *steel* piston. This feature, together with the adequate cooling fins provided, makes an extreme high compression ratio safe and practical. This in turn permits *you* to use power yielding Ethyl gasoline fuel blended with castor oil as recommended for Tiger engines.

In short the Tiger has forged ahead in the pattern of all modern aircraft engines to give you higher prop speeds and the extra performance essential to your success.

BUNCH MOTOR COMPANY

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to the pilot make up the third phase. Weather experts teach him to use weather maps and he studies carefully the daily weather reports until he understands all the fundamentals necessary to his proper training. This constitutes the fourth phase and it is of vital importance, since he will be in constant contact with weather bureaus throughout the United States when he takes over active duty in the air corps.

Almost without any actual flying up to this point the ground school training has embedded in the mind of the student all the necessary knowledge relative to flying a plane. Of course, there have been many hours of dual instruction in ships in the air to illustrate the different phases of flight control to the cadet, but most of his time has been spent on the ground learning the fundamentals.

Next month we shall follow our Flying Cadet through the rest of his training.

A Flying Twin Motor Douglas DB-7

(Continued from page 27)

per hour. While the landing speed of 72 m.p.h. may seem high, it must be kept in mind that, with a tricycle landing gear, landing gear speeds of 120 m.p.h. are perfectly safe.

The United States Army Air Corps has given the Douglas company a $25,000,000 order for a slightly modified version of the DB-7, to be known as the Douglas A-20 and the A-20A.

After closely studying this ship you will find that it very admirably lends itself to a flying scale model. The general set-up of the job though quite speedy, has remarkable stability; due to the large tail surfaces and dihedral in the stabilizer. Even with the dihederal in the stabilizer, there is not the slightest tendency for the model to rock during flight. The two high-pitch props pull the plane up in a climb that would put the "big job" to shame! The props rotate in opposite directions to eliminate torque. Careful construction and design have kept the weight down to a mere two ounces. Now let's get down to actually constructing the Douglas Attack Bomber DB-7.

Fuselage

In constructing a fuselage such as this one it is best to use the half-shell method. First attach the fuselage drawings so that they line up perfectly. Before going any further, we should say that all the wood used in the construction of the DB-7 should be of the lightest grade obtainable. That does not mean the soft spongy grade.

First cut out all fuselage bulkheads from 1/16" sheet balsa. Only half the bulkheads are shown on the plans, thus it will be necessary to make two each of those shown. Bulkheads B, C, D, E and F are all the same shape, so you make 10 of these.

Pin the bulkheads in their proper positions on the plans, making sure that they are at right angles to the working surfaces. Now pin the 1/16" square hard balsa stringers in place directly on top of the bulkheads and cement them very securely. Trim the ends of the stringers flush with Bulkhead A-A. Note that one stringer ends at Bulkhead H-H and one at I-I.

After the cement has set on the framework remove the framework and glue the other half of the bulkheads to their respective first halves. Add the stringers to this side of the fuselage. Shape the tail block from 3/16" sheet balsa and glue in place, bringing the rear of the fuselage stringers flush with its edges.

Shape the nose block from a soft balsa block and cement in place. The bamboo framework should be bent and shaped from 1/32" square strips and glued in place; the design is shown in the plans. The pilot's inclosure and rear gunner's cockpit is made in the same way. These may now be covered with thin celluloid. The nose will require small pieces of celluloid because of the compound curves there.

Bend the front landing gear strut from .038 music wire to the shape shown in plans, insert a celluloid 5/8" diameter wheel in place and then cement it with several coats to the rear of bulkhead A-A. A small piece of balsa is cemented behind bulkhead A-A to help shape the front of the pilot's cockpit.

Wing

Space permits us to show only one half of the wing. You will have to trace and then invert the wing plan shown to get the left wing panel.

Make a cardboard template of the wing rib at the root. With this template slice from 1/16" quarter-grained sheet 18 upper ribs of 1/16" square and 18 lower ribs of 1/16" square. Shape the leading edge from 1/4" sheet and the trailing edge from 1/8" sheet and pin them in place. The trailing edge will have to be blocked up 1/8" to fit in the airfoil contour.

Now glue the top ribs in place, but to the leading edge only. After the cement has set trim the trailing edges of the ribs so they fit to the trailing edge. After the cement has set well, remove the wing from the plan and attach the lower parts of the ribs in the same manner. Cut the wing spar from 1/16" sheet to the shape shown by the dotted lines in the plans; slip the spar in place through the ribs, cementing each rib to it. The wing tip is shaped from a solid piece of 1/16" sheet balsa.

The ends of the leading edge and wing spars should be cut to the required angle so that they fit together inside the fuselage with necessary dihedral angle of 1 1/2" under each wing tip. The wing should be glued in place before it is covered. You will note in the side view that the wing position is given very clearly.

Motor Nacelles

The two motor nacelles are shaped from solid, very light and soft balsa and then hollowed to the necessary thickness.

Two balsa blocks 1-1/2" x 1-1/2" x 5-1/2" will be required. First trace the top view onto the blocks, then shape with a sharp knife. Trace the side view onto the block and shape. The nacelle is then trimmed with a razor to the required cross section.

Finish the job with fine sandpaper. Now split the nacelle down the top so that you will have two sides. Hollow these two halves with a knife, razor, and sandpaper till the walls are about 3/64" thick in the center and slightly thicker at the front, as shown in the plans. The two hollowed-out halves may now be cemented back togeth-

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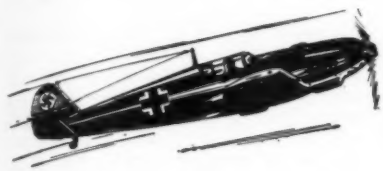

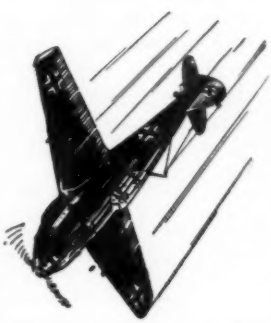

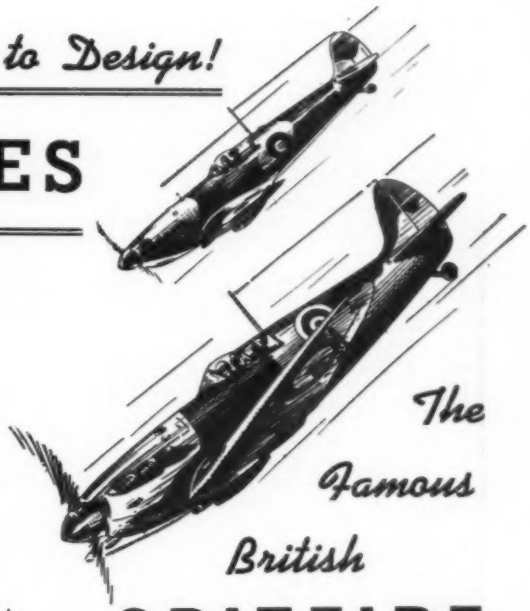

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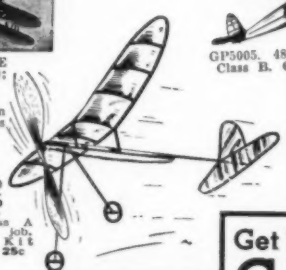

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3/32 O.D., 5" 23c
⅛ O.D., 5" 25c
¼ O.D., 5" 40c

WIRE, per 100 ft. Straight Lengths

No. 6.....32c
No. 8.....27c
No. 12.....32c
No. 14.....37c

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6x8, doz. 60c

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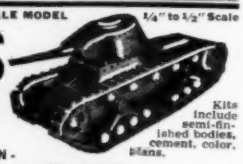

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er again; giving them two coats of clear dope. Sand with 10-nought sandpaper.

Cut out the two nacelle bulkheads from hard 1/8" sheet balsa, drill a hole for the nose bearing and then cement in place. Bend the landing gear struts from .038 music wire to the required shape shown in the plans and cement the strut very firmly to the nacelle. You will note that the wire runs through the floor of the nacelle, along the floor and then half-way up the side for added security.

Either balsa or celluloid wheels of 1 1/8" diameter are held on the axles by a drop of glue at the end of the wire.

The finished nacelles are not cemented in place on the wings until the wings are completely covered.

Tail Surfaces

The tail surfaces are very easy to construct; the rudder is built from all 1/16" flat stock. The spars are 1/16" x 1/8" strips and the ribs are 1/16" square strips. The tip is cut from 1/16" sheet balsa. Pin all the members in place and cement them carefully. Make sure when you remove the rudder from the plans that there is no warp; if there is, steam it back to shape.

The stabilizer is built in the same manner as the rudder, with the exception that all the stock used in the stabilizer should be 1/8" flat. You need a strong stabilizer because it has to carry the load of two motors on it.

The stabilizer has 1" dihedral at each tip.

Bend two rear hooks from .034 music wire and cement them to the last outer ribs at the stabilizer tips. The hooks are glued to the bottom of the stabilizer, by the way, and not the top.

Propellers

Two propellers are required. They should be carved so that one is right-handed pitch and the other left-handed pitch, "to do away with" torque and thus save you a major adjustment problem. The props are of rather high pitch for a flying scale, but they give a marvelous performance.

The blocks are 3/4" x 1" x 5" and should be shaped to the blank shown in the plans. The wood may be light grade because you need have no fear of broken props on this job; the tricycle landing gear and the propeller positions take care of that. The props should be covered in the conventional way, with the hubs about 1/8" thick and the tips tapered to 1/32" in thickness.

Two prop shafts of .034 wire are bent to shape, slipped through the hardwood nose bearing, a few copper washers and then inserted into the prop hub, bent at right angles and cemented to the prop. Give the prop hubs several coats of cement just to "make sure." The two props are now treated with clear dope in the same manner the nacelles were.

Covering

The author covered his DB-7 with the new Silkspan; regular tissue paper may be used however. The stabilizer should be attached to the fuselage before it is covered.

Trim a piece of covering to the shape of the fuselage, wet it thoroughly with water then place it on the fuselage and smooth out all the wrinkles. Then run clear dope over the extremities. The dope will penetrate and act as a good adhesive. Repeat for covering the other side of the fuselage.

The wing is covered in the same way but extreme care must be used at the fuselage and wing joint to insure a good and clean job. Separate pieces must be used to cover the wing tips. Cover the rudder and stabilizer in the same manner as the wing.

After the covering and dope have dried, spray on a coat of water to tighten any loose spots. After the water dries apply one thin coat of clear dope with a brush. When the clear dope has dried apply two very thin coats of silver dope to give that aluminum finish; use just enough silver dope to give the job a solid color; for, while silver is the lightest of colored dopes, nevertheless too much will add unnecessary weight to model.

All of the exposed wood parts, as the props and nacelles, are also given two coats of silver dope.

All details, such as the elevators, fin and flaps, are shown by doping thin strips of black tissue paper to the surfaces. Either British or French insignia may be applied. The inside of the motor cowls are painted black.

Flying

Each prop of your DB-7 should be turned by four strands of 1/8" flat brown rubber. Two "S" hooks will be needed to attach the rubbers to the rear hooks. Attach the rubber motors to the S hooks, drop the hook through the opening in the nacelle bulkhead, through the nacelle and out of the small hole at the rear of the nacelle. Then connect the S hook to the rear hook. The prop shafts are now slipped on the motors.

Flying your plane is definitely a two-man job; you will need a helper to hold the ship by the props while you wind the ship with a double winder. Another reason for using props of opposite pitch is because all double winders turn in opposite directions.

Before any flights are made test your ship for the gliding angle by gliding it over some tall grass. The author had to add a little modeling clay to the nose for perfect balance; you will probably need to do the same, due to the weight of the motors being so far back.

Now that you are ready for your first flight have your helper hold the ship by the

(Continued on page 54)

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Academy of Model Aeronautics

(Continued from page 24)

be worth the small price you ask. If it is what I hope, I will be in the market for quite a few of them.

"We finished my outdoor flying for this area with a 12th Anniversary Meet. This meet was held at Jackson's Mill, the state 4-H Club Camp.

"Jackson's Mill is the place where we conduct the Model Aviation School for Recreation Leaders from 32 counties of the state. I have just returned from Beckley, in the southern end of the state, where a county school for twelve recreation leaders is conducted. At these schools we give them some building, but it is mostly organization and conduct of model aviation clubs and procedure before, during and after model airplane contests, A.M.A., etc.

"Have you ever considered calling a conference of contest directors?

"Thanks to your cooperation, we have big things planned for 1941."—CARL A. HOPKINS, Clarksburg, W. Va.

Ruth's Query; Marchi's Answer

"In the case of towline gliders—how many flights are made; three or nine? If towline releases before sufficient altitude is reached can this be called a delayed flight or does flight stand? After start of an official flight and model does not perform properly can delayed flight be called?

"In the case of gas models—do three successive delayed flights give 40 seconds or no time in figuring the average time, and can an assistant director who is not an Academy member be named at the meet?"—Howard E. Ruth, Buffalo, N. Y.

"The rules definitely state that in the case of towline gliders only three official flights may be made. It is only in the case of hand-launched gliders that each contestant is allowed a total of nine official flights with no delayed flights being recognized or allowed. Continuing with towline gliders, if the towline releases before sufficient altitude is reached, that does not constitute a delayed flight unless the flight does not last 20 seconds or longer.

"When a model takes off or is released for an official flight and does not perform properly a delayed flight cannot be called unless the model does not fly for 20 seconds or longer. Otherwise, every model that is in poor adjustment would, at the discretion of the contestant, be called a delayed flight and you realize what havoc this would cause at any contest of major proportions.

"In the case of gas models, we have two types of delayed flights. One is when the motor run is over 20 seconds. This is called a 'voided delayed flight.' The second type is when the motor does cut out at 20 seconds or under but the model does not fly an additional 20 seconds to bring the time up to a total of 40 seconds. This is a delayed flight. I believe the latter is what you referred to when you asked the question, 'Do three successive delayed flights give 40 seconds or no time in figuring the average time?' Three successful flights constitute an official and the highest time of any of these delayed flights may be figured as an official for determining the three-flight average. For example, the motor cuts out at 19 seconds, the plane flies for a total of 39 seconds on two subsequent tries, does not do any better. The contestant may call a 39-second flight his official and this will constitute one official flight to be used in determining the three-flight average.

"However, if the model builder cannot control his timer so the engine cuts out at 20 seconds or less, the three successful delayed flights would constitute one official but the time would be zero. You see, there is a very fine line of demarcation and it is determined by whether the delayed flight is a voided delayed flight when the motor runs over 20 seconds, or whether it is just a delayed flight when the motor cuts out at the proper time but the model does not fly for 40 seconds or more.

"All personnel who aid you in running a contest should be Academy members, since this insures a working knowledge of the rules and regulations and also carries the official authority which Academy members possess. However, if you do need someone to help you and should he not be an Academy member, we suggest you call him an assistant to the director, and not an assistant director."—BRUNO P. MARCHI, Chairman, Contest Board, Academy of Model Aeronautics.

Modelers Meet Thru A.M.A.-M.A.N.

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one of your old friends, Paul Deschene. You are responsible for our meeting in a more or less indirect way, if you remember sending a picture of Paul's hydro to MODEL AIRPLANE NEWS about a year ago; that is how it happened. I liked the hydro so much I wrote him and since then we have 'drummed up' quite a correspondence. It was not until last week-end that we met in person and both got quite a kick out of this coincidence. Paul has a very fine knowledge of aerodynamics and should have more publicity so other fellows could profit by it."—GEO. ANDREWS, Jax. Hts., N.Y.

Suggestion for Meet Entry Blank

The official Academy of Model Aeronautics regulations state, "Each contestant shall assemble all lifting surfaces and fuselage. The design may be obtained from any source. Only the builder may fly the model for records. Models built from kits are acceptable."

"I hereby swear that each and every model I am entering in this competition has been built by me in conformity with the foregoing stipulations and meets all other A.M.A. regulations and also any special regulations set up for this contest."

Marston Suggests Speed Events

"As promotion manager of The Des Moines *Register and Tribune,* I am naturally interested in the success and continued growth of the statewide model airplane contest which this newspaper sponsors annually. That interest lies behind this letter which is written with more than just our own contest in mind.

"Despite the fact that our model plane contest has grown every year in number of contestants, there is no blinking the fact that as a spectator sport, model plane contests leave much to be desired.

"The basis of competition, namely duration of flight on limited engine run, is not apparent to the layman without considerable explanation (which we have endeavored to give at all meets). Because of this single element in competition, a contest has a certain sameness through the day. In other words, it is a lot more exciting to the kids who are in it than the patient throng that 'gapes.'

"I wonder if it would not be possible to develop some simple device for measuring the speed of model planes? If this were possible, planes could be built for two distinct purposes in two classes. Interest and competition would be heightened—especially among the general public which is more able to grasp speed than flight duration drama.

"Two ways in which a measure of plane speed might be secured suggest themselves to me:

1. Some variant of the air-pressure-actuated-plunger might be attached to the wing or body of a model plane. By air pressure acting on a diaphragm, a measure might be obtained of the maximum speed attained by a plane in the course of a limited-engine-run flight.

2. A small propeller with a revolution-recording device might be attached to the plane from which speed could be figured.

"I am sending this letter to you purely as a layman who is interested in the development of model plane building. If it strikes any spark that results in an extension of interest in this sport which is of such significance to our country, I shall feel well-repaid."—JOHN MARSTON, *Des Moines (Iowa) Register & Tribune.*

Janke Decries "Phony" Fuselages

"Last summer at the two indoor contests I attended (that's my yearly average—the Nationals and the annual S.B. & F. Meet, no others being held within a thousand mile radius of our city), I was somewhat annoyed at the sight of several 'phony fuselage' jobs floating around. Obvious rule dodgers, they were really tractors with the rubber inside the tube to meet the enclosed motor clause and a filled-in wing-mount for cross section area, and of course a landing gear. Apparently the contest directors hadn't the moral courage to rule them out, but only by an extremely lenient interpretation of the fuselage requirements could these atrocities be dignified with the title 'Indoor Cabin Model'; hence the term, 'phony fuselage.'

"Conversation with several of the culprits responsible was discouraging, but I should like to see such goings-on stopped by changing the present rules, or clarifying them, lest the 'honest' fuselage jobs be crowded out entirely with stand-patters like myself forced to build the phony jobs in self-defense. Have you any suggestions?"—CURTIS D. JANKE, Sheboygan, Wisconsin.

Good News

"We are in the midst of making plans for coordination of all A.M.A. clubs in the state, and if they are not A.M.A. clubs, to see that they are. When our plans are fully developed, I will be glad to inform you just how we come out."—MISS FRANCES ALEXANDER, Akron, Ohio.

Corbett Turns Correspondent

"I am now writing a column for the *Detroit Free Press* on model aviation. Therefore, I would appreciate all news releases from your office. If you should find time, I would appreciate an article written by you on any phase of model aeronautics you choose for publication in my column. I will boost the Academy every opportunity I get."—STEVE CORBETT, Detroit, Michigan.

Casano Asks for Missing Motors List

"Here are a few things I have on my mind which I think will help the Academy, and I would like to have your cooperation.

"In this section of Jersey there is an epidemic of gas model stealing at Cherry Hill, Lincoln Park—in fact, in the entire North Jersey section. The idea is this: I sell and repair motors and often have used motors offered to me cheaply. I have so far succeeded in recovering a number of stolen planes through the motor numbers. Why can't the Academy have a list of stolen motors printed month-

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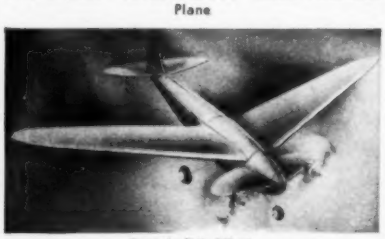

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ly in the leading magazines? I am sure Bill Winter, Charlie Grant and Dave Cooke will be glad to cooperate with us in this matter. All directors can thus be on the look-out for the cheap thieves who are making gas model flying risky.

"I am with Curtiss-Wright now as Final Inspector, and we have a good percentage of model builders in the plant."—ALBERT CASANO, Passaic, N.J.

Congressman Aids Aeromodelers

Through the cooperation of Jennings Randolph, member of the House of Representatives from the Second West Virginia District, novice model aviation flyers throughout West Virginia are now affiliated with N.A.A's aeromodeling division, the Academy of Model Aeronautics.

A short time ago it was pointed out to Congressman Randolph that a number of the younger model builders throughout the State of West Virginia were unable to compete in the many A.M.A. sanctioned meets because they did not hold an individual sporting license issued by the Academy. To meet this need, the Academy has an affiliated club program which permits the affiliation on a yearly basis of a large number of novice flyers. In most communities a sponsor is available to secure this affiliation for modelers but in the case of West Virginia, where the activity is under the direction of Carl A. Hopkins of Clarksburg, as the representative of the Works Projects Administration, there are no sponsors nor did there appear to be the possibility of lining up an organization which would be willing to sponsor activity and affiliate the model flyers.

Congressman Randolph who has been interested in model aviation for quite some time and who is a frequent spectator at West Virginia meets, heard of the plight of the young aeronauts from his state and dug down into his own pocket for the affiliation fee so the youngsters could carry on their flying under A.M.A. sanction and recognition. In securing the affiliation for Mr. Hopkins' state-wide organization, The West Virginia Modelers Club, Mr. Randolph said, "I feel certain that other men in public and official life will want to help in this splendid movement."

For the first time in their history all novice flyers in West Virginia are now affiliated with the Academy of Model Aeronautics. Their association with the Academy was made possible through a public-spirited individual who recognizes the important role of model airplane activity and the desirability of as many youngsters as possible participating in it.

Personnel of the Academy Completed with Appointment of Vice Presidents and Committee Members

The personnel of the Academy has been completed through the appointment of vice-presidents and committees, as designated in the by-laws of the Academy which were published in *Model Aviation* last July. It is felt certain that all Academy leaders and followers will approve heartily the choices made.

Membership on the committees is not complete and new members will be added from time to time. The vice-presidents were selected by the committee, which also designated the various districts of the Academy during its meetings at the National Contest in Chicago.

The Contest Board members and committee members are those who have demonstrated their loyalty, support and understanding of the Academy and its work. The state contest directors are those who have indicated their willingness to serve, and a national program is now being evolved by Academy leaders which will soon be submitted to its representatives throughout the field, who in turn can place it before the model builders.

The complete personnel of the Academy is as follows:

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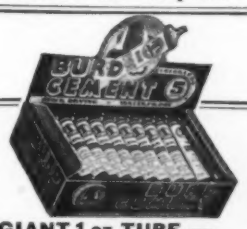

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March 1—PHILADELPHIA, PA. P.M.A.A. Fourth Indoor Flying Scale Meet. V. R. Fritz, CD.

March 2—WHEELING, W. VA.

March 15—PHILADELPHIA, PA. P.M.A.A. Fifth Indoor Endurance Meet. V. R. Fritz, CD.

March 23—PITTSBURGH, PA. First Allegheny Mountain Area Model Meet sponsored by the Aero Club and Boys' Club of Pittsburgh. Gas, rubber and glider events for merchandise prizes. Harry G. Vogler, CD, 1633 Duffield St.

March 29—PHILADELPHIA, PA. P.M.A.A. Fifth Indoor Flying Scale Meet. V. R. Fritz, CD.

April 12—PHILADELPHIA, PA. P.M.A.A. Sixth Indoor Endurance Meet. V. R. Fritz, CD.

April 13—PITTSBURGH, PA. Second Allegheny Mountain area Model Meet. See March 23 listing.

April 23—PINE VALLEY, N.J. Spring Pine Valley Gas Meet at Pine Valley Airport. Gas, all classes, plus a beauty and

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THE WORLD'S RECORD HOLDING PHANTOM BULLET

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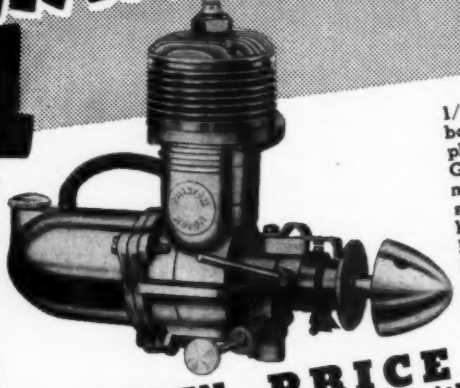


BULLET SPECIFICATIONS
1/7 h.p.; 2 cycle rotary valve; ¾" bore; ⅝" stroke; .275 cu. in. displacement; bare weight 4½ oz. Gravity feed carburetion; Diamond bored crankcase; hardened steel timing cam; solid steel case hardened crankshaft; die cast Magnesium connecting rod; lapped alloy steel piston; fully equipped heavy duty radial mounting.

NEW VALVE PRINCIPLE AND IMPROVED CRANKSHAFT IMPROVES PERFORMANCE
Undreamed of performance by use of new SQUARE VALVE increases engine performance as much as 15 to 20%. Square valve stays open longer than old round type. Lets more gas into gas chamber, thereby developing more power. An additional improvement is the new crankshaft which is fully counter-balanced for longer engine life. Made from reduced weight case hardened steel. Features a new small type center hole.

NEW PRICE OFFER
Puts Phantom Motors within reach of all!

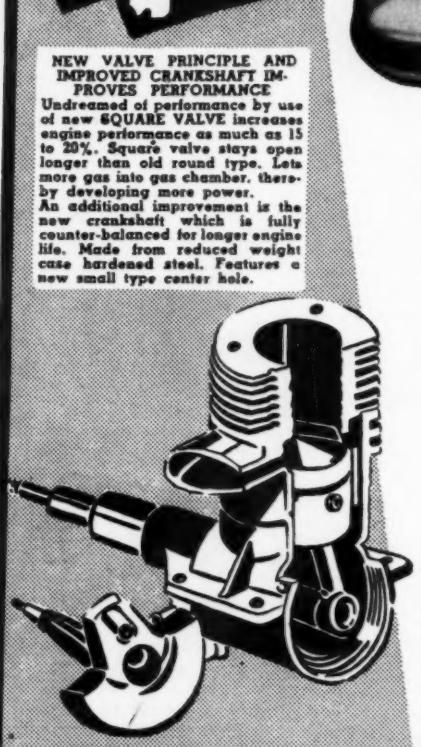
Now everybody can own a Record Breaking Phantom Torpedo or Bullet! The tremendous demand by model builders for these 2 motors has enabled us to lower production costs . . . AND OUR POLICY OF SELLING DIRECT TO THE BUYER allows us to pass these savings on to you. Imagine saving $5.55 on the Phantom Torpedo; $5.50 on the Phantom Bullet.

NOW there is no reason why you, too, can't install a Record Breaking Phantom in YOUR model . . . the same type motor that took one model to 11,500 feet, has flown another 55 miles, has stayed up 2 hours, 46 minutes, 43 seconds.

Don't delay! Send the attached coupon today! And your Phantom Motor will come streaking back to you ready for installation. Ready to break records for you!

BULLET & TORPEDO CLASS "B" ENGINE FEATURES

- New special heavy duty type radial motor mounting (replaceable plus standard beam mounting).
- Special float type gas gauge (Torpedo only).
- Newly designed larger sturdier gas tank made from Magnesium alloy.
- Gas tank can be mounted on either side of the fire wall.
- All motors equipped with the new Smith "Fire-Cracker" Coil.
- Torpedo produces almost 1/5 horsepower with weight of 4¾ oz. Bullet produces almost 1/6 horsepower with weight of 4¾ oz.
- Motors built to be used upright or inverted.
- Your motor on its way 24 hours after order received.
- Every motor power block tested in our factory and sold to you under a bonded factory guarantee.



PHANTOM MOTORS
800 East Gage Ave., Los Angeles, Calif.
Please RUSH the items checked below:

[ ] Money-order enclosed. [ ] Send C.O.D.
[ ] New improved 1941 Phantom "Bullet" complete with coil, tank and condenser $7.25
[ ] New Super Phantom "Torpedo" engine complete with coil, tank and condenser - - - - - - - - - - - - - $10.95
[ ] Special 11 in. hardwood propeller - $0.49
[ ] Miss Tiny Kit. Propeller and Phantom Built "Bullet" - - - - - - - - - - - $11.95

Add 3% if delivery point is in California.
Prices Slightly Higher in Foreign Countries

NAME .....
ADDRES .....
CITY .....
STATE M-15

NEW VALVE PRINCIPLE AND IMPROVED CRANKSHAFT
Torpedo Only

TORPEDO SPECIFICATIONS
1/7 h.p. @ 14,000 r.p.m.; 2 port 2 cycle type; bore .725; stroke .724; static thrust 30 to 32 oz. plus; displacement .2989 cu. in.; weight 4¾ oz.; downdraft carburetion; plus size Magnesium gas tank; Champion V-2 spark plug, exclusive offset principle . . . easier starting, more power; metal enclosed condensers; additional crankcase fins; Diamond bored crankcase; oversize anti-friction bronze bearings; lapped alloy steel piston; die cast Magnesium connecting rod; special new type heavy duty radial mounting.

FOR ONLY **10.95**

stunt event. Over $400 in prizes will be awarded to winners. E. N. Angus, 24 Ormond Ave., Oaklyn, N.J., C.D.

April 26—PHILADELPHIA, PA. P.M.A.A. Sixth Indoor Flying Scale Meet. V. R. Fritz, CD.

May 3—PHILADELPHIA, PA. P.M.A.A. Third Outdoor Endurance Meet to be held near Castor Ave. and Magee St. in Philadelphia. Victor R. Fritz, CD, 1427 Spruce St., Philadelphia.

May 11—DENVER, COLO. Exchange Gas Model Club of Denver Record Trials. Prizes are not contemplated. H. W. Bennett, CD, 3405-07 E. Colfax Avenue, Denver.

May 17—PHILADELPHIA, PA. P.M.A.A. Fourth Outdoor Endurance Meet. See May 3rd listing.

May 18—ALBANY, N.Y. Schenectady Aeroneers Model Plane Meet, to be held at Albany Airport for combined gas rubber, and gliders. Prizes for winners. J. Paul Lusk, CD, 204 Clinton St.

May 19—PITTSBURGH, PA. Third Allegheny Mountain Area Model Meet. See March 23rd listing.

May 31—PHILADELPHIA, PA. P.M.A.A. Indoor Championships in Convention Hall, Philadelphia. Victor R. Fritz, CD, 1427 Spruce St.

June 7—PHILADELPHIA, PA. P.M.A.A. Outdoor Championships at Castor Ave and Magee Sts. in Philadelphia, Victor R. Fritz, CD, 1427 Spruce St.

June 8—DENVER, COLO. Exchange Gas Model Club Denver Record Trials. See May 11th listing.

July 3, 4, 5, 6—????. Dates reserved for 1941 National Championships.

July 6—DENVER, COLO. Exchange Gas Model Club of Denver Record Trials. See May 11 listing.

July 20—PITTSBURGH, PA. Fourth Allegheny Mountain Area Model Meet. See March 23rd Listing.

August 10—DENVER, COLO. Exchange Gas Model Club of Denver Record Trials. See May 11th listing.

August 14 and 16—ST. LOUIS, MO. Ninth Annual Mississippi Valley Model Airplane Contest, to be held Arena Building (indoors), and Parks Airport (outdoors). Sponsored by Stix, Baer & Fuller Model Airplane Club and Young Men's Division, St. Louis Chamber of Commerce; events are for indoor stick, cabin, and helicopter, and outdoor gas, rubber, and gliders. $400 in prize awards. R. H. Somners, CD, Stix, Baer & Fuller Department Store.

August 17—PITTSBURGH, PA. Fifth Allegheny Mountain Area Model Meet. See March 23rd listing.

September 14—PITTSBURGH, PA. Sixth Allegheny Mountain Area Model Meet. See March 23rd listing.

September 14—DENVER, COLO. Exchange Gas Model Club of Denver Record Trials. See May 11th listing.

September 21—PINE VALLEY, N.J. Pine Valley Falls Gas Meet at Pine Valley Airport for gas, all classes, plus beauty and stunt events. Over $400 in prizes. E. N. Angus, CD, 24 Ormond Avenue, Oaklyn, N.J.

October 5—PITTSBURGH, PA.—Allegheny Mountain Area Model Championships sponsored by the Aero Club and Boys' Club of Pittsburgh. Gas, rubber, and gliders for merchandise prizes. H. G. Vogler, CD, 1633 Duffield St., Pittsburgh.

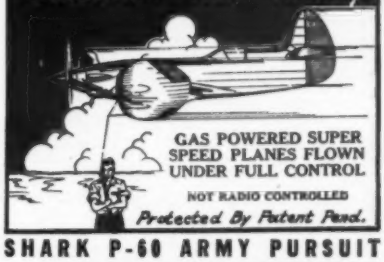
October 5—DENVER, COLO. Exchange Gas Model Meet of Denver Record Trials. See May 11th listing.

NATIONAL RECORDS

INDOORS (Longest Flight)		CITY	TIME
Stick Model, H.L., Class B			
Junior:	Martin Friedland	Philadelphia	18:55.5
Senior:	George Micot	Allentown	20:46.0
Open:	Bruno P. Marchi	Washington	15:10.0
Stick Model, H.L., Class C			
Junior:	R. Jagiello	Chicago	19:17.3
Senior:	Martin Nemirofsky	Philadelphia	18:22.6
Open:	M. S. Andrews	Philadelphia	26:39.0
Stick Model, R.O.G., Class A			
Junior:	Arthur Saltzman	Philadelphia	10:09.0
Senior:	Milton Huguelet	Chicago	12:23.5
Open:	Hyman S. Oslick	Philadelphia	15:32.0
Stick Model, R.O.G., Class B			
Junior:	Martin Friedland	Philadelphia	17:00.0
Senior:	Martin Friedland	Philadelphia	19:56.5
Open:	Frank Haynes	New York City	12:37.3
Stick Model, R.O.W., Class A			
Junior:	None established		
Senior:	Ted Gonsoph	Philadelphia	10:51.0
Open:	M. S. Andrews	Philadelphia	8:04.4
Stick Model, R.O.W., Class B			
Junior:	Arthur Saltzman	Philadelphia	14:10.2
Senior:	David Call	Philadelphia	15:49.0
Open:	None established		
Glider, H.L., Class A			
Junior:	Otto Curth	Chicago	:44.7
Senior:	Dushan Deschich	Chicago	:46.2
Open:	Leo Vartanian	Chicago	:54.3
Glider, H.L., Class B			
Senior:	Stanley Stanwick	Boston	:33.0
Junior:	Otto Curth	Chicago	:44.7
Open:	None established		
Fuselage, R.O.G., Class B			
Junior:	H. Kaczynski	Detroit	12:42.3
Senior:	Harry Lerman	Boston	13:30.0
Open:	C. Werle	San Francisco	13:48.6
Fuselage, R.O.G., Class C			
Junior:	R. Jagiello	Chicago	11:32.3
Senior:	Gordon Cain	Boston	15:53.0
Open:	Ervin Leshner	Philadelphia	15:33.6
Fuselage, R.O.W., Class B			
Junior:	None established		
Senior:	William Hawkes	Philadelphia	3:26.0
Open:	None established		

"G" LINE FLYING

Sensational - New - Thrilling



GAS POWERED SUPER SPEED PLANES FLOWN UNDER FULL CONTROL

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SHARK P-60 ARMY PURSUIT

FLASH

Three Sensational New "G" Line Models

New Rubber Power Kit Two Gas Power Kits

Build and Fly one of these thrilling new ARMY TYPE PURSUIT "G" Line Speed Ships. All Kits are unusually complete throughout.

Complete Shark P-60 Kits

Rubber Power Kit Complete	For All Class A & B Motors	For All Class C 1/5 H.P. Motors
$1.95	$1.98	$2.98
Postage 20c	Postage 20c	Postage 30c

BABY SHARK SUPER SPEEDSTER

COMPLETE KIT $1.98 Postage 20c

The new BABY SHARK, Super Streamlined Speed Ship, is designed for all Class A and B motors. This snappy little job flies at tremendous speeds of from 50 to 75 M.P.H.

TIGER SHARK SPEED DEMON

DELUXE KIT $4.95 Postage 30c

The TIGER SHARK, Super Speed Demon, is designed for all 1/5 H.P. motors. It roars through the air at unbelievable speeds of from 60 to 90 M.P.H.

TEXAS RANGER

Combination Model

The TEXAS RANGER is a combination model, designed for both "G" Line Flying and Free Flight. It may be powered with any Class "A" or "B" motor.

DELUXE KIT ..... $4.95 Postage 30c

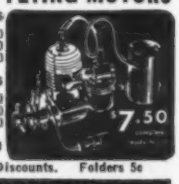
APPROVED "G" LINE FLYING MOTORS

1/5 H.P. CLASS "C" MOTORS

Brown Model "D"	$12.50
Bunch Tiger Aero	$16.50
Ohlsson "60"	$21.50

CLASS "A" and "B" MOTORS

Brownie Model "E"	$7.50
Mighty Atom	$15.50
Ohlsson "23"	$16.50



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New Bamboo Tissue

for Gas Jobs—applied WET OR Dry—Superior Quality—Great Strength—Gives smooth satin finish—Easy to apply—Current Sensation and without equal

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PROPELLERS we are still featuring a JAPROP. This propellor is perfectly finished in all sizes. A WHITFIELD leader at a real saving.

MINIATURE CELLULOID MOTORS New type, stronger! 1½", 2", 2½" & 3".

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New Supercharger

Increases Your Motor's Power and Speed

A real Supercharger, attachable to all Class B or C motors, to give your motor More Power and Revolutions. Most modern centrifugal design. Special baffles built into the case not only produce pressure but mix gases more thoroughly to produce perfect combustion. Centrifugal rotor is driven at two times engine speed. Gives that extra Power and Speed your motor should have. Weight, complete with all attachments, 2¼ oz.

Sent, postpaid, for only $3.00. Satisfaction guaranteed. Send today.

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BUILD YOUR OWN CLASS B MOTOR

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Illustration of assembled PC-2 kit — less coil and condenser

Madewells for immediate shipment. The hottest motor on the market in price, 'pearance and performance, **$7.50**

In Stock — RACE CAR FANS — In Stock

World Champion **HORNET motor . . . $35.00**

BILLETT'S HOBBY CRAFT SHOP

2548 NICOLLET AVE.
MINNEAPOLIS ··· MINNESOTA

Autogiro			
Junior:	None established		
Senior:	Ralph Brown	Boston	2:51.2
Open:	None established		
Ornithopter			
Junior:	None established		
Senior:	Armando Sinibaldo	Chicago	1:27.2
Open:	Ed Lidgard	Chicago	3:01.8
Helicopter			
Junior:	Ted Gonsoph	Philadelphia	2:50.4
Senior:	H. Lerman	Boston	5:13.8
Open:	Joseph P. Matulis	Chicago	2:12.4
OUTDOORS (3 Flight Average)			
Stick Model, H.L., Class C			
Junior:	L. Vargo	Chicago	5:01.4
Senior:	Roy Messinger	Linden, N. J.	11:15.0
Open:	Chester D. Lanzo	Cleveland	14:49.2
Stick Model, H.L., Class D			
Junior:	Clarence Roberts	Clarksburg, W.Va.	6:11.8
Senior:	Robert Davis	Clarksburg	8:04.2
Open:	Toful Petraitus	Akron	7:02.6
Stick Model, R.O.W., Class C			
Junior:	Bill Seegmiller	Lakeland, Fla.	1:04.0
Senior:	Gordon Peterson	Oakland	:48.0
Open:	J. Schneider	Scotia, N.Y.	:22.3
Stick Model, R.O.W., Class D			
Junior:	Bill Seegmiller	Lakeland	1:22.2
Senior:	None established		
Open:	John Schneider	Scotia	:42.4
Glider, H.L., Class B			
Junior:	Austin Rinaldi	Jersey City	2:05.0
Senior:	Charles Richbourg	St. Augustine	2:49.5
Open:	C. W. Johnson	Jacksonville	1:24.1
Glider, H.L., Class C			
Junior:	Robert Kaufmann	Barberton, Ohio	:20.0
Senior:	Stewart Bennett	Oakland	1:07.0
Open:	J. Schneider	Scotia	:21.0
Glider, H.L., Class D			
Junior:	Leonard Wolf	Lakeland	:13.8
Senior:	Clifford Doyle	Jacksonville	:34.6
Open:	H. Thomas	Akron	:46.4
Glider, T.L., Class C			
Junior:	Robert Hine	Gloversville, N.Y.	:53.8
Senior:	Ray Frodey	Pittsburgh	1:34.4
Open:	Mike Morel	Cleveland	1:24.0
Glider, T.L., Class D			
Junior:	James Kelly	Rennerdale, Pa.	:39.1
Senior:	Owen Niehaus	Rochester, Pa.	5:42.0
Open:	Albert Reed	Schenectady, N.Y.	1:35.2
Glider, T.L., Class E			
Junior:	None established		
Senior:	Harold Geres	Flushing, N.Y.	5:52.0
Open:	George Brown	Jersey City	1:47.7
Autogiro			
Junior:	None established		
Senior:	R. Meuser	Oakland	:11.3
Open:	None established		
Helicopter			
Junior:	None established		
Senior:	R. Meuser	Oakland	:35.4
Open:	None established		
Ornithopter			
Junior:	None established		
Senior:	None established		
Open:	None established		
Fuselage, R.O.G., Class C			
Junior:	Richard Querman	Clarksburg	4:03.8
Senior:	Walter Seegmiller	Lakeland	6:35.4
Open:	Walter Fromm	Chicago	3:26.5
Fuselage, R.O.G., Class D			
Junior:	William Stewart	Huntington, W. Va.	5:09.1
Senior:	C. C. Johnson	Hampton	7:14.0
Open:	Norbert Lisiecki	Cleveland	5:05.3
Fuselage, R.O.G., Class E			
Junior:	None established		
Senior:	Armond Nielson	Lakeland	1:07.0
Open:	Edward L. Smith	Jacksonville	1:31.1
Fuselage, R.O.W., Class C			
Junior:	None established		
Senior:	Manuel Andrade	Oakland	1:22.2
Open:	J. Schneider	Scotia	:48.6
Fuselage, R.O.W., Class D			
Junior:	Robert J. Bates	Clarksburg	2:33.0
Senior:	Robert Davis	Clarksburg	3:11.0
Open:	James E. Long	Clarksburg	2:30.0
Gas, R.O.G., Class A			
Junior:	R. Lieber	Philadelphia	2:07.9
Senior:	Joseph Beshar	Paterson, N.J.	16:39.0
Open:	W. Gibson	Hamilton	15:50.7
Gas., R.O.G., Class B			
Junior:	Bobby Davis	Atlanta	21:33.8
Senior:	B. Redeker	Cincinnati	9:20.3
Open:	Dr. R. E. Podolsky	St. Louis	13:46.0
Gas, R.O.G., Class C			
Junior:	Larry Maze, Jr.	St. Louis	9:19.5
Senior:	J. Leiendecker	Ft. Wayne, Ind.	10:08.3
Open:	J. Konefes	Chicago	19:18.5
Gas, R.O.W., Class A			
Junior:	None established		
Senior:	Phil Weatherwax	Pittsburgh	:29.3
Open:	None established		
Gas, R.O.W., Class B			
Junior:	None established		
Senior:	Fred Gross	Cranford, N.J.	:36.5
Open:	Elmer C. Wasman	Lakeland	:14.0
Gas., R.O.W., Class C			
Junior:	None established		
Senior:	Sal Taibi	New York City	:45.2
Open:	G. Gilchrist	New York City	:31.6

GRUMMAN F3F1

U. S. NAVY SHIPBOARD FIGHTER

A fine detailed model with retractable landing gear, 4" turned balsa motor front, 3 oz. silver dope, ½ oz. yellow, 2 oz. glue, etc. All parts printed on balsa, 10" propeller, wheels, rubber motor, full size drawing, and all parts. This fighter plane is used in large numbers on the aircraft carriers. Const. Set complete, postpaid. **$3.75**

NEW SEVERSKY P35 PURSUIT SPECIAL

32" Span. Length 25". 1" Scale. Color, yellow and blue.

Set has all parts printed on balsa, set of blue and yellow paints, glue, etc., insignia, full size drawing, and all parts. Special exhibition equipment of six 1⅛" and one 2" die cast aluminum bombs, 10" three-bladed aluminum controllable pitch prop, and 5" turned balsa motor front. This model can be used as either flying or exhibition type. Set, postpaid..... **$4.50**

CURTISS HAWK F11C4 PURSUIT

32½" Span. Length 22¾". 1" Scale. Weight 6 oz. Color grey, top wing yellow.

THE MOST EXCLUSIVE AND FINEST EQUIPPED MODEL IN THE WORLD. MOVABLE CONTROLS WORK FROM COCKPIT. A special de luxe model, one of the most beautiful ever made. Set contains a 4½" scale Wright Cyclone celluloid motor, detailed push rods, fins, etc., like real motor, 4½" aluminum cowl, 10" steel type carved prop shown, 2¼" wheels, tail wheel, star and rudder insignia and lettering, rubber, windshield, instrument board, flying wires, 4 aluminum step plates, aluminum wing walks, ready cut wheel pants, washers, 3 oz. grey paint, ½ oz. yellow, ½ oz. red, 2 oz. glue, etc. All other parts are printed on balsa wood. 33"x44" scale drawing. Const. set, complete in labeled box, postpaid..... **$4.50**

GRUMMAN F5F1 SKYROCKET FIGHTER

24" Span. Length 17". Weight 3 oz. Actual Photo of Model

A sensational new scale model of the Navy's fastest fighter. The model flies well, using two 7" propellers. Const. set contains all parts printed on balsa, two 2½" turned balsa motor fronts, two 7" carved props, wheels, insignia, colored dopes grey and yellow, glue, full size scale drawing, and all parts. Const. set, postpaid..... **$2.95**

NEW TAYLORCRAFT SPORTPLANE

36" Span. Length 22". 1" Scale. Weight 2 oz.

COMBINATION LAND AND SEAPLANE SET

A beautiful exact scale flying model with unusual flying range, so light it will rise from land or water in 6 feet. Const. set contains all parts printed on balsa, carved propeller, hardwood wheels, 2 oz. white dope, ½ oz. black, glue, full sized scale drawing, and all parts to build, and parts to make floats. Set p.p..... **$1.50**

NEW CURTISS SO3C1 NAVY SEAPLANE

30" Span. Length 27". 1" Scale.

Set has all parts printed on balsa, colored paints, scale drawing, and all parts to build. Set, postpaid..... **$2.95**

SEVERSKY P35 ARMY PURSUIT

32" Span. Length 25". 1" Scale. Color, silver.

Set has 4" turned balsa motor front. 10" carved prop, balsa wheels, tail wheel, rubber, all parts printed on balsa, 3 oz. silver dope, ½ oz. black, 2 oz. glue, etc., insignia, and full size scale drawing. Const. set in labeled gift box, postpaid..... **$3.25**

BOEING B-17 FLYING FORTRESS

44" Span. Length 30". Color, silver.

Set has all parts printed on balsa, four 2" turned balsa motor fronts, four 4" carved props, celluloid wheels, set of paints, glue, and full size drawing. Set postpaid..... **$4.50**

SPECIAL DE LUXE SET. Includes following exhibition equipment: Four 2" aluminum cowls, four 2" celluloid motors, four 4" 3-blade cast metal propellers, two 2¼" M & M pneumatic air wheels. Const. set, postpaid..... **$6.25**

CURTIS F11C4 SOLID MODEL

10½" Span. Length 7½"

This is a special deluxe solid model. Set has completely finished balsa fuselage, cockpit cut out, routed pants, wings cut to shape, 1½" deluxe cast motor, alum. cowl, 3 bladed cast prop, paints, drawing and all parts. Set p.p..... **$1.50**

CURTISS P36 ARMY PURSUIT

37" Span. 1" Scale. Color, silver.

Set has turned motor front, set of paints, glue, all parts printed on balsa, and full size drawing. Set postpaid..... **$3.25**

NORTHROP A-17 ARMY FIGHTER

24" Span. Length 17". ½" Scale.

Set has 7" prop, turned motor front, wooden wheels and complete set of paints. Postpaid..... **$2.50**

BOEING F4B4 NAVY FIGHTER

22½" Span. Length 14½". ¾" Scale.

Set has 3" celluloid motor, 3¼" tapered aluminum cowl ring, set of paints, etc. Postpaid..... **$2.95**

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Beautifully illustrated 7½"x9½" 16 page catalog showing large photos of Army and Navy Fighters, Gas Motors, Gas Models, etc. Includes 2-page catalog supplement. Get yours today. 10c coin.

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THE MOST Daring OFFER EVER MADE!
$1 DEPOSIT
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BROWNIE 'B' or 'E'; 'STANDARD'; 'OK' TWIN, '49' or SYNCRO B-30—Your own choice!
25¢ WEEKLY
in convenient payments ($1.00 monthly) as you fly or race under this sensational "cash-price-on-credit" plan exclusive with Polk!
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$21.50 Brown 'B' $1 Dep. ($12.00 COD)
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7.50 Brown 'E' $1 Dep. (3.50 COD)
12.50 'OK' 49 $1 Dep. (6.50 COD)
12.50 'OK' Spec. $1 Dep. (6.25 COD)
Pay Balance Weekly
$1 reserves choice & brings shipping order form. Pay Postman COD balance when your engine arrives then 25c weekly 'til paid for! No extras of any kind!
25¢ WEEKLY FOR THIS $9.45 FLYING COMB.
SYNCRO B-30
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HUMMING BIRD
Prize-winning class 'B' comb. 40" span. Easy to build. 18 oz. ship. $1 dep. reserves Syncro B-30 & Humming Bird. COD $5.50.
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A Flying Twin Motor Douglas DB-7

(Continued from page 44)

props, then attach the S hooks to the winder and give the motors about 75 turns for a test flight. Your ship should climb a bit then settle in a long glide and come in for a perfect landing. If any adjustment is needed at this point do so by changing the angle in the stabilizer. The model should balance right on the rear landing gear strut mark.

When fully wound, the DB-7 takes off like no bomber ever did and climbs at an amazing angle. Some of you old timers who can still remember the climb on the old twin-pushers know what we mean. After the power is spent, your model will go into a very flat and fast glide. The landings are a treat to see; the ship just seems to slide in on its three wheels. Well, we won't say any more except, you build the ship and just wait and see!

A Record Holding Nationals Winner

(Continued from page 19)

to supplement the rubber bands which hold it in place. Another good habit to get into is to thoroughly test your flight timer and motor before each contest until you are perfectly satisfied with them.

The rules allow the contestant a 20-seconds motor run and the modeler is foolishly wasting his time if he allows his plane to fly with five or six seconds under the allotted motor run. Therefore spend plenty of time in getting an exact timer setting and see that your motor is at its tip-top performance. Don't go to the limit and risk an over-run; but utilize every second of the twenty that is permitted, because every fraction of a second on the motor run means more precious altitude—and that is what wins the contests!

Well, we leave you with an excellent little ship and a very good chance to turn in some winning flights with it. Loads of luck and many a "riser" with your "Demon"!

Lifting or Non-Lifting Tail

(Continued from page 24)

never be possible to get an indoor tractor to fly with the wing far forward on the motor stick, without the action of a lifting tail; and all of the recent record-breaking indoor ships surely have been flying with the wing far forward. Of course, on gas models, getting the wing far forward is primarily the result of the weight of the motor.

It is also true, that a lifting stabilizer has better "anti-stalling" properties than a flat tail of the same area. As the angle of attack of the tail is increased, which is exactly what happens when the model starts into stall, the lift of the cambered section is increased. Hence there is a tendency to dampen out the stall before it even has a good opportunity to get started.

For outdoor gas models the lifting tail has a decided effect in pulling the model out of a very steep climb with minimum loss in altitude. In order to get the longest possible flight with a limited engine run allowed, it is absolutely necessary to get the model to the greatest altitude while the engine is still running, then have it lose the least amount of altitude when the engine cuts. In this position it will be more liable to pick up favorable thermals and have longer total flight time. For this reason most gas models are designed and adjusted to climb at a very steep angle; when the model reaches the top of the climb it will be almost in a stalling altitude and, as we have just seen, lifting stabilizer tends to pull it out of a stall. In this way, as soon as the motor stops, the weight of the engine in the nose coupled with the lifting force of the cambered tail, will bring it into a level glide, with hardly any loss in altitude.

Obviously, an under-cambered stabilizer would not have this effect. The under-cambered stabilizer is quite an old principle, known for a good many years among all model builders. Ernest McCoy was the first to use it on an indoor tractor, back in 1928. He developed the so-called "Mystery Ship" which broke all existing records at that time and was characterized by its stable flight and long flat glide. The diagram explaining the reaction of this type of tail is shown in Figure 2.

In this case the center of lift is located behind the center of gravity and produces a forward moment as shown. To counteract this moment the stabilizer is cambered on the underside. This produces lift, or force F', in a downward direction and sets up a moment about the center of gravity which is equal and opposite to that moment produced by the center of lift. Thus, the net result is once again zero, as shown by the equation:

$$F' \times d = C.L. \times D$$

Therefore, $(F' \times d) - (C.L. \times D) = 0$

The big disadvantage to an under-cambered stabilizer is the same thing which gives the lifting stabilizer its great advantage, except that it reacts in the opposite direction. When the tail is lifting down it becomes necessary to move the wing back in order to balance the model, and thus it does not fly at its highest L/D value; hence, not at its best efficiency. McCoy's tractor was very notable by the fact the wing was located very much towards the rear of the motor stick; in fact more than half-way along the length. Of course, had the model been equipped with a tail boom such as is done today, some of this effect would have been offset; but tail booms were not used at that time. However, this is still an outstanding disadvantage of the under-cambered stabilizer and for that reason it has been replaced almost exclusively by the lifting tail.

There remains one last type of stabilizer: the neutral or non-lifting tail. This force diagram is shown in Figure 3. A neutral stabilizer is one which is equally cambered on both top and bottom, or in other words, a symmetrical airfoil. Thus the force produced by the tail is zero and the net moment about the center of gravity is zero. This is also the case when the stabilizer is a flat surface, but this type of tail is rarely ever seen in model use. A neutral tail, however, is sometimes used on large plane designs, particularly the light, private-owner type of airplane.

Thus, we have seen that the lifting

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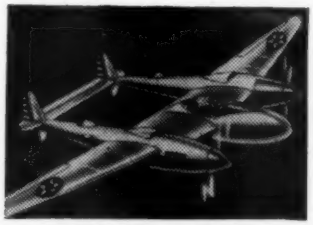

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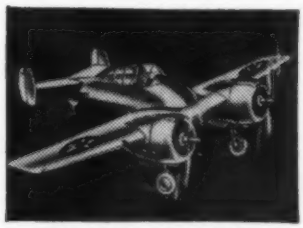
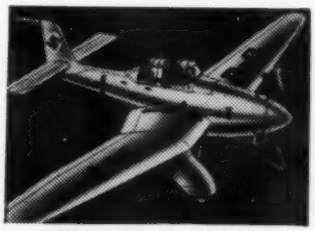


GRUMMAN SKY ROCKET

The three models above are exhibition models. Not recommended for flying.



STUKA DIVE BOMBER

DOUGLAS DIVE BOMBER

VOUGHT SIKORSKY

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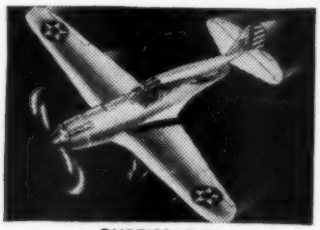
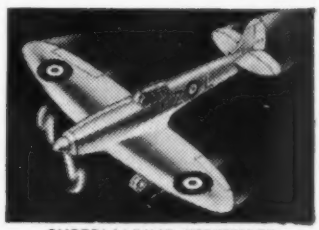


CURTISS P-40



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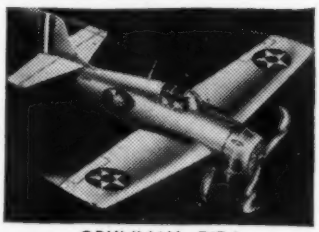

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stabilizer, first used in modern type tractors in 1919, by Charles H. Grant, is the best type of tail to use for model use. With all its desirable features it is not hard to understand why it has come into almost universal use. Carl Goldberg has made what is perhaps the most unique application of such a stabilizer in his designs of indoor endurance ships. He has combined the features of the lifting tail with a rather frail leading edge on the horizontal tail, which will change the resultant force of the tail as the model assumes various attitudes of flight. For example, if the ship goes into a dive, no matter how shallow, the leading edge will bend down, increase the negative angle of the tail and bring the ship out of the dive. However, it takes quite a bit of experience and experimenting to find the proper strength for the leading edge structure. This is indeed a very ingenious application of the fundamental aerodynamical principles.

In conclusion it is well to remember that the moment of horizontal stabilizer about the center of gravity of the complete airplane is always restoring, or making for stability. The action of the tail is similar to that of a weather vane: If it is disturbed, the wind pressure on the vane, acting behind the point of support, sets up a moment which tends to restore the vane to its original position. The action of the airplane is exactly the same. For this reason it is important that the horizontal tail be correctly designed.

The Martin Marauder

(Continued from page 15)

the Martin experimental department is a miniature factory within itself, with complete facilities from preliminary engineering design to the finished airplane within this one group, adjacent to the production engineering department. The static test laboratory is one of the most modern to be found and the physical and chemical analysis work are among the most important functions of the company.

This, then, is the father and the home of our Plane on the Cover for March 1941, the slashing monster from Mars shown on our cover. From this famed aeronautical pioneer and this huge, modern plant has come the Martin B-26 attack-bomber. Research has been the keynote in the design of this wicked eagle and its structure includes the solution to more than a dozen new aeronautical engineering questions.

The war in Europe has brought out the one salient need of modern warplane design: a fast, potent attack-bomber with speed and range great enough to assume the duties of an escort fighter. Two previous solutions have been offered to this problem, both begun in the early days of World War II: the Douglas DB-7 and the North American B-25. The Martin B-26, however, incorporates a dozen specific principles actually gleaned from reports from the front.

Basically, the B-26 is a high-wing monoplane twin-engine high-speed attack-bomber featuring a tricycle landing gear and the first four-bladed propellers installed in the past decade on a U.S. Air Corps service ship. Production simplicity has been stressed throughout the construction and the fuselage is designed in three sections; the nose section back to the pilot's compartment, the center section including the wing inner panels, and the aft section to the tail. These three sections are butt-jointed and bolted together. Conventional bulkhead and stringer construction is employed throughout. The skin is attached to this framework and only 24 ST Alclad sheet is used. Flush riveting has been employed exclusively and the finished surface smoothed with rotary polishers to lower skin friction.

The fuselage has a perfectly circular cross section to aid and simplify former and bulkhead fabrication. This construction was used on the B-26 to aid in the development of a later and more advanced model of the same ship equipped with a pressurized cabin for extremely high altitude sub-stratosphere combat work. The entire nose section of the fuselage is a paraboloid of moulded-plastic-acetate sheet made in two half sections and joined about the horizontal axis by channel-section aluminum alloy. A flexible free-moving fitting is mounted in the upper portion to provide for the forward machine-gun. The bottom half section also has a cutout to provide an opening for the bomb sight. The wings' inner panels are constructed integrally with the fuselage center section. The aft end of the fuselage is also glass enclosed to provide accommodations for a tail gunner. An opening is provided in the bottom portion of the nose section to admit the retracted nose wheel. Other than these openings and three small windows, the fuselage structure is a completely enclosed structure.

The wings are of two-spar full cantilever type and are built in four sections: the two inner panels and the two outer panels. Pressed flange ribs connected by laterally laid stringers and heavy intercostals provide a framework over which the 24 ST Alclad sheet skin is flush riveted. There is no dihedral and the planform has a regular taper. The ailerons are of aluminum alloy all-metal construction fabric-covered and are internally balanced both statically and aerodynamically through the use of heavy lead counter-weights bolted into the nose section forward of the hinge line. The tip sections are removable and both left and right tip sections contain airspeed indicators. Split trailing edge flaps are mounted between the nacelles and fuselage, and two small flap panels between the nacelles outboard to the ailerons. Wing light cutouts are provided in the center of the outer panel leading edges and are glass covered, formed to the contour of the leading edge.

Power is provided by two Pratt & Whitney 18-cylinder double-row radial engines developing 1,850 horsepower each. These drive huge four-bladed Curtiss electrically-controlled all-metal propellers of the full-feathering type which have a diameter of 13 ft. 6 inches. For the first time in a production model, propeller "sleeves" have been fitted in the Martin B-26. These are heavy metal cases which preserve the

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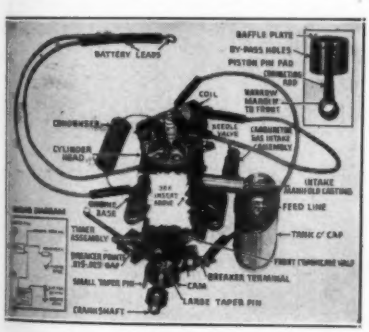

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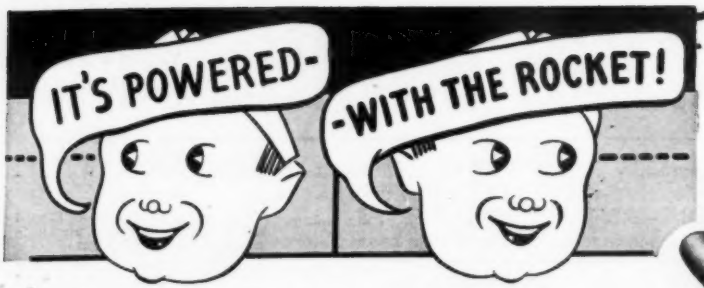

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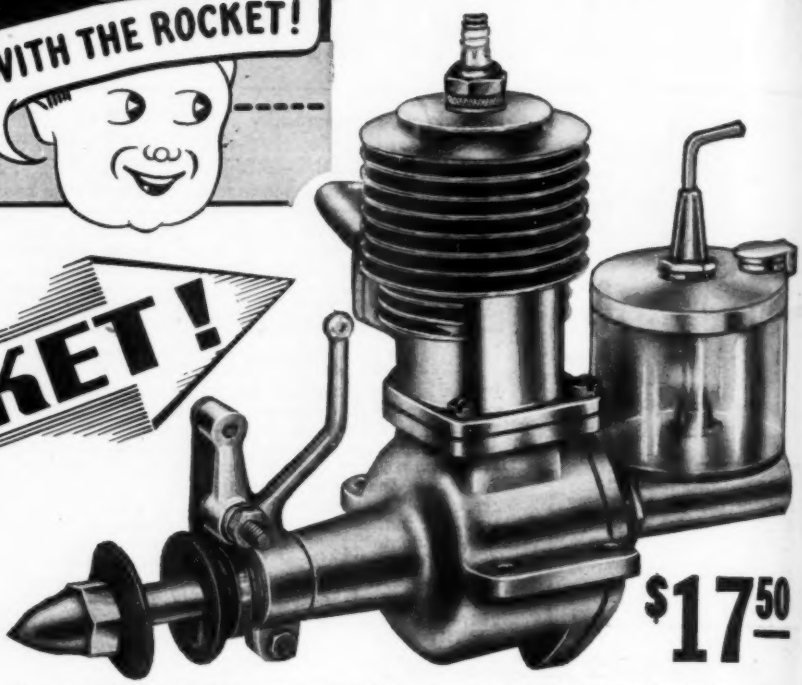

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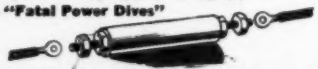

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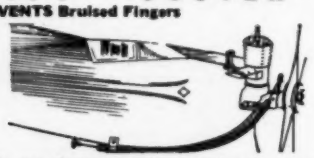

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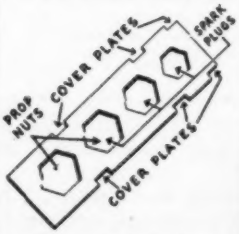

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Keep your *fire-power* at the TOP with GENERALS. They're HOT! One piece *seamless* zinc cup—absorbent separator—curled-over-edge zinc, mean longer life, hotter spark, lighter weight. Ask your dealer.

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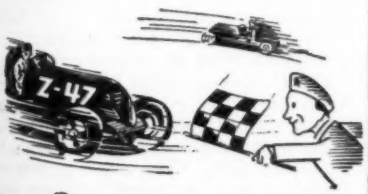

Keeps cylinder walls and all bearings in *perfect* condition. In handy cans.

½ pint 25c—Pint 40c—Quart 75c, *at your dealer.*

More FUN! More FLIGHT!
JIFFY GADGETS

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CHICAGO

contour of the blades clear into the hub. This prevents disturbance of the airflow around tht hub and in addition provides a positive thrust completely into the hub.

The motors are mounted on heat-treated chrome-molybdenum steel tubing mounts bolted into the forward face of the wing's front spar. The giant twin-row engines are highly supercharged by gear-driven blowers and for this reason it has been possible to fit ejector exhausts to the B-26, a practice directly a result of wartime service reports. These exhausts, which actually suck gases out of the cylinder chambers without waiting for the push of the exhaust piston stroke, increase the horsepower and general performance efficiency by 10%. The oil temperature regulators are located within the engine nacelles and cold air is taken through a small opening in the bottom portion of the ring cowl. Small fully retractable outlets are mounted in the bottom of the nacelle just forward of landing gear doors to provide a large and fast flow of air through the radiators during steep climbs and while operating at low altitudes. Two carburetor air intakes are provided through small openings in the upper portion of the nose cowling to provide air for the dual type eight-port down-draft carburetor mounted just aft of the engine. The aft end of the nacelle's structure is built integrally with the inner wing panel. Shear joints of the vertical pin type join the inner and outer wing panels at the nacelle outboard wing joint.

The tricycle landing gear of the Martin Marauder is of the single-leg semi-cantilever type utilizing small fittings at each upper end to provide resistance to side loads. The main landing gear is of the single fork type, folding upward and forward into the central portion of the nacelle. Two huge clamshell doors fold into the bottom of the nacelle, completely enclosing the bottom mold-line to provide a smooth surface to the airstream. The nose wheel folds rearwards and it, in turn, is sealed by two large doors. Retraction of the landing gear, landing gear doors, wing flaps and ring cowl cooling gills is by hydraulic control. All of these items have emergency manual control. A vane-type hydraulic pressure pump is mounted on the accessory drive gear box of each motor and provides emergency alternate and complimentary power in the event of failure of one of the power plants. The ejector exhaust block is completely enclosed in a streamlined housing lying close outboard near the bottom of each motor nacelle. Each outboard flap panel is faired into the trailing edge of each nacelle in such a manner that an uninterrupted airflow is provided with any position of the flaps.

The nose gunner is situated within the fuselage proper with his feet placed forward on two braces provided within the nose turret. He also acts as bombing officer, the bomb sight being located between his legs in the bottom half of the nose section. The pilot and co-pilot sit high atop the fuselage in a completely enclosed cabin-type structure with adequate vision available in the forward hemisphere. The front, sides and top of the cabin opening are glassed in. The radio operator and navigation officer is located below and behind the control cabin and he is equipped with complete command set receiving and transmitting radio equipment. Radio marker beacon and direction finding equipment is also mounted on a special navigational radio table situated on the left side of the cabin. The photography officer is situated in the rear of the fuselage forward of the tail section and is provided with retractable camera doors and a large window in the bottom of the fuselage. The rear gunner is located in the extreme aft end of the fuselage with room enough to sit and handle guns in an erect position, something heretofore found impossible in U.S.-tail-turret designs.

The tail surfaces are full-cantilever all-metal design, the horizontal and vertical stabilizers being built up on a structure of ribs and channel sections all flush riveted with 24 ST Alclad skin. The rudder and elevators are all-metal fabric-covered and, like the ailerons, are statically and aerodynamically balanced through the use of internally bolted counterweights. Due to the nature of the rear gun implacement, vertical tail surfaces are mounted atop the fuselage and sit high in the slipstream, thus lending themselves more effective. A small tail skid is provided on the bottom of the fuselage near the aft bulkhead to provide emergency resting point for the fuselage in the event of a nose-high landing by inexperienced personnel.

The bottom portion of the fuselage center section includes the main bomb bays. Release is accomplished through two large hydraulically operated bomb bay doors which hinge outward into the airstream. The bombs are mounted in vertical bomb racks, two pairs on each side of the fuselage. Release is controlled by the bombardment officer from his position over the bomb sight in the front gun turret and is accomplished by electrically operated solonoids actuating mechanically the release latches.

The front gunner handles a single weapon only. The gun fitting has been designed to accommodate several different types of guns including a 30 or 50 caliber Colt-Browning machine gun, or a 27 or 37 millimeter aerial cannon. His arc of fire and vision is unrestricted throughout the entire forward hemisphere due to the monocoque construction of the glass housing. The rear gunner can be equipped with any of the above-mentioned weapons mounted in a similar fitting along the rear turret's trailing edge.

Main fire-power of the Martin B-26, however, is concentrated in the power-driven rear upper turret mounted on top the fuselage forward of the vertical stabilizer. This huge turret offers unrestricted fire and vision in the entire upper hemisphere. The immense success of the power-driven multi-gun turret by the Royal Air Force has been borne in mind in the design and installation of this new type and incorporates refinements over anything yet produced.

REAL PLANES IN MINIATURE

KEEP IN STEP WITH MODERN AVIATION—BUILD METAL COVERED MODELS

Actual Photograph of Vultee Vanguard Model

It is easy and fascinating to build real planes in miniature with sheet aluminum covering. Imagine these models, completely covered with aluminum even to reproducing the rivets in the actual planes. The photograph will give you an idea of how the finished model will look.

The kits contain all balsa parts cut to outline shape, die-cast propellers, rubber military type wheels, aluminum tubing for landing gear, celluloid windows, finest super detail plans, aluminum sections ready to apply. Nothing missing to build a real plane in miniature, with the exception of liquids.

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21" BOEING STRATOLINER (Postpaid) $3.75

(This kit is absolutely complete, including motors, aluminum cowls, liquids, etc.)

13½" VULTEE VANGUARD 48A $1.50
13¼" CURTISS HAWK 75A..... 1.50
12" CONSOLIDATED PB2A..... .75
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9" NORTHROP A17A..... .40

If your dealer can't supply you, send direct and include 15c postage with $1.50 kits and 10c with other kits. No C.O.D.'s. No stamps. Cash at your own risk.

Write for illustrated descriptive folders.

C Z MODEL AIRPLANE CO.
Dept. M, 3656 W. 65th St., Chicago, Ill.

DEALERS: Your customers will be asking for these kits. Write today for prices on your letterhead. Be prepared for the demand.

The B-26 presents several new and outstanding features, chief of which are the self-sealing fuel compartments and armor plating. The culmination of over a year's research and development, the Martin self-sealing tank is expected to prove one of the outstanding achievements in the aviation design field. The tank is not bullet-proof in the popular sense of the word, but rather does it permit the quick and easy passage of bullets completely through the tank, after which the hole is immediately sealed fuel-tight. This is accomplished through the use of several varying layers of vulcanized and raw rubber. The instant the high octane fuel touches the raw rubber, the latter swells into an expansion seal immediately closing the opening and preserving the fuel within the tank. Armor plate of an entirely new composition, light as ordinary aluminum yet bullet-proof, is used in the construction of the cabin. The pilot and co-pilot as well as the three gunners are all encased within a shell of armor plating, thus protecting them from the onslaught of enemy bullets.

The plane has a wing span of 46 feet 8 inches and is 42 feet 4 inches long. It stands 9 feet 9 inches high in horizontal three-wheel position. It has a gross weight of 26,625 pounds, 2,460 pounds of which is disposable bomb load. Fuel capacity is 416 gallons and 42 gallons of oil is carried, divided between the two engine nacelle oil reservoirs.

According to preliminary test reports conducted by W. K. Ebel, chief engineer and test pilot of the company, with Edward Fennimore as co-pilot, the Martin B-26 medium bomber has a top speed of 346 miles an hour and cruises at 313 miles per hour. It has a cruising range of 2,450 miles and can climb to 34,500 feet with full military load.

Lessons of the war have been incorporated full force in this latest of a type now fast becoming standard. Of the same general design as the Douglas A-20 and North American B-25 light bomber, this newest design presents an advanced solution to the many problems of the type. A preliminary order for 1,100 model B-26 has been awarded the Glenn L. Martin Company, involving an expenditure of $99,641,880. This single type will be produced for the U.S. Army Air Corps. Other projects now in production by the firm include the model 187, a development of the 167 attack-bomber originally supplied to the French Government but now being shipped to the Royal Air Force; the PBM twin-engine long-range Patrol-bomber flying boat for the U.S. Navy and a development of this huge type now under construction for the Fleet Air Arm of the British Navy.

BUILD A MODEL MARTIN B-26

Select a block of clean, straight-grained balsa wood, cut to length and width as shown on the drawing. Shape on a lathe or by hand into a perfectly circular cross section tapering toward the aft end of the fuselage. Mark the wing plan forms out on a ½" sheet of balsa and saw out the outline. Sand these to a rough airfoil shape.

Using a fine grade of sandpaper, sand the fuselage to shape, utilizing the exclusive MODEL AIRPLANE NEWS silhouette templates A-A, B-B, C-C and D-D. In preparing these templates, cut them from the drawing and mount them on heavy cardboard, then cut along the interior outline carefully. Leave the outside contour lines on the drawing for reference.

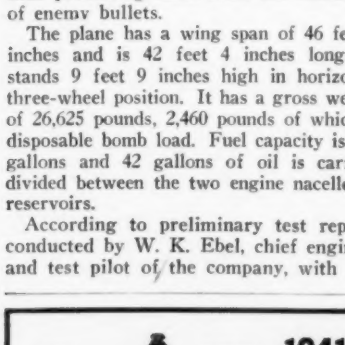
Follow this same procedure for the wing templates. For accurate cross sectioning, hold the fuselage or wing endwise to the light or the sun, place the template at the proper position indicated on the drawing and sand away the rough spots through which light does not show. Continue this until no light filters past the template held tightly against the side of the wing or fuselage.

The engine nacelles are easily turned out on a lathe and finished with a fine grade sandpaper. The wheels should be purchased from your nearest model supply store or any of the model companies advertised within these pages. Due to the fact that four-bladed propellers are used, it may be difficult to purchase these, particularly the type equipped with blade sleeves. Therefore, these should be carved, out of pine preferably, with each of the four blades cemented to the hub. Particular care should be exercised that each blade is laid at exactly ninety degrees (right angle) to the other.

The tail surfaces are carved from sheet balsa ⅛" thick and are of symmetrical airfoil section. These are cemented in place at the fuselage and left to dry, taking care they are laid at an exact right angle to the fuselage. If a large model is made, the horizontal stabilizers and elevators should be placed at a ten degree angle with the horizontal. On a small model this need not be done.

The landing gear is installed with the aid of small pine struts turned out on a lathe or carved by hand. The various intricate cylinders and fittings should be carefully included as they will enhance the appearance of the model. Celluloid should be used for the cockpit enclosures and rear gun turret. The circular nose and rear upper gun turret should be cut from the end of a celluloid cylinder, available at a drugstore in the prescription counter.

The entire surfaces of the fuselage and wings should be painted brilliant silver with black India ink lines indicating the ailerons, landing gear doors and tail surface hinge lines. The under surfaces of the wings may be painted light blue and the upper surfaces a brilliant orange. A coat or two of dope, applied before putting on the color, will give a smoother finish. Sand each coat gently with fine sandpaper. Standard U. S. Air Corps circles and stars should be purchased from a model supply house and stickered on. The rudder is trimmed in standard air corps horizontal, alternate red and white stripes. The legend U. S. should be placed on the upper surface of the left wing panel and lower surface of the right wing panel (facing the nose of the ship from the tail). The legend ARMY should be placed on the opposite locations. An additional coat of clear varnish will preserve the colors and present a more lustrous finish.



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Displacement .69 R.P.M.-2000-7000. Block tested and tuned to peak performance. Full ¼ h.p. Material costs going up. **Order TODAY and SAVE MONEY.**

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SPECIAL! Complete outfit — famous Syncro B30 or Sky Chief motor—and *your* choice of any $2.95 kit, all for only **$9.90 P. P.**

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1/16 sq. 60, 5c
1/16x1/4 35 for 5c
1/16x3/16 18, 5c
1/16x1/4 15 for 5c
3/32 sq. 30, 5c
1/8 sq. 30 for 5c
3/16x3/16 12 for 5c
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5/16 sq. 8, 5c
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18" Balsa Sheets

1/64x2 6 for 10c
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3/32x2 7 for 10c
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2" & 36" cost twice 18"; 3x36, 3 times.

NOSE BLOCKS

1x2x1 1c
2x2x1 2c
2x2½x1 3c
3x3x1 4c
3x3x2 7c
3x3x3 9c
5x5x2 17c

5 FOOT BALSA

1/8x3/16 12 20c
1/8x1/4 10 20c
3/16 sq. 8 20c
1/4 sq. 6 20c
1/4x1/2 3 20c
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Sheets, 4 times 18". Double the above price for genuine aircraft SPRUCE

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4 oz. 23c, 1 oz. 10c

PROP. BLOCKS

1/2x 3/4x 5 7—5c
1/2x 3/4x 6 6—5c
5/8x1 8 3—5c
1/4x1 1/4x10 2—5c
2 1/4x1 1/4x12 3c ea.
1x1 1/2x12 5c ea.
1x1 1/2x15 6c ea.

Plywood—3/32 1/16, 1/8, 1/4 40c ft.

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1 oz. 5c, 1/2 pt. 30c
2 oz. 9c, pint 50c

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1 oz. 6c, 2 oz. 11c
1/2 pt. 35c, pt. 60c

MICROFILM RUBBER LUBE
8c ea.

WOOD FILLER LIQUID CELLULOID
1 oz. 9c 2 oz. 15c

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White, Red, Yellow, Orange, Blue 3 for 25c.—"00" —3c per sheet.

Gas Model Silk
H'vy qual. 45c yd.

AA TISSUE
All col., doz. 10c
Silver, ea. 4c
Supersilk, wh. 5c

Bamboo Paper
White 5c, 6 for 25c
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1 1/4, 1 1/2—40c
1 3/4, 2—50c
2 1/4, 2 3/4—60c
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3-1.25—3 1/2-1.50
4 1/2-1.75

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New 3"—$1.00
3 1/4 1.50, 3 1/2 2.75
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PROPELLERS

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5"	4c- 7c	Mod.	
6"	5c- 9c	8"	35c
7"	6c-12c	9"	35c
8"	7c-15c	10"	35c
9"	8c-19c	11"	35c
10"	9c-23c	12"	35c
12"	10c-28c	13"	35c
14"	12c-40c	14"	35c
15"	15c-50c	15"	X
16"	16c-X	16"	35c
18"	25c-X	18"	50c

RITZ Gumwood
8"-9"-10"-11" 15c
12"-13"-14" .15c
15"-16" .25c
17"-18" .35c

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Champion Spark Plugs 3/8 or 1/4 65c
Condensers—Metal, 13c Smith 25c
Plugs & Jacks, Set of 2-35c val. 25c
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Spaghetti Tubing 1/16" 3 ft.—10c
Toggle Switch 50c val. 25c
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Sheet Alum—ft. .003 10c .010 15c

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Washers, pinhole, 1/8, 1/4, 2 doz. 3c
Prop Shafts, doz sm. 6c, large 10c
Ball Bear; 1/16 15c ea., 1/8 33c
Nose Plugs for 3c; 1/8"—8, 3/4"—8, 1" 4.

MUSIC WIRE

.014 6 ft. .2c
.020 .028 6 ft. .3c
.034 .040 6 ft. .6c
.049 .6ft. .8c
1/16" .8 ft. 5c.
3/32" .5 ft. .15c
1/8" .5 ft. .20c

BROWN RUB'R

1/16 sq. 15 ft. 5c
1/8 flat 15 ft. 5c
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Skein 225 ft. 1/16 50c, 1/8—60c, 3/16—85c

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3/4" 2c, 1 1/4" 4c
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Keep Them Up

(Continued from page 11)

The use of information we will shortly present on the above can vary the power consumption 100%. So, if your model is to get up there—AND STAY—study it carefully!

Contrary to many model "experts", selection of the proper airfoil can make as much as 50% difference in the power factor $\frac{C_D}{C_L^{1.5}}$ and hence in the dead-air duration of our models. It behooves us then to study airfoils carefully. Since single-surfaced airfoils have one less variable surface we will consider them first; dividing our material into several parts.

The Effect of General Outline

Fig. 2 graphically illustrates the significant dimensions and aerodynamic characteristics of nine airfoils. Test sections were 20" x 5" of typical indoor construction. Correcting for residual turbulence; the effective LV (product of chord and velocity both in ft.) was about 7 ft.^{2} per sec. (equivalent to heavy Wakefield model).

From the chart we can make several deductions. Most important is the relationship between the front camber and various characteristics. We can definitely say that at these speeds *undue humping of the front of the airfoil* (note airfoils No. 3 and No. 7) *increases the drag and decreases the lift, thereby increasing the power factor and decreasing possible endurance.* The smooth "arc" type section No. 4 (similar to McBride B 7) shows the best characteristics. This effect is probably explained by Fig. 3, taken from airflow photographs by the author. (Footnote No. 2.) We see that at low speeds the air leaves the top surface of the airfoil almost immediately and never drops down again to provide lift and reduced drag. Many men are working on this problem called "separation", as it still applies at higher speeds. Various artificial means of preventing separation may be developed (Footnote No. 3) but at present the gradually curved leading edge seems the best bet.

The trailing edge seems to have little effect on lift, probably because the upper air is out of reach and the lower surface air has little lifting effect. However, the trailing edge does affect the drag; a slight warp up having less drag than a warp down.

Effect of Camber on Arc Sections

Fig. 4 shows the results of varying the airfoil camber or curvature with the same general outline as airfoil No. 4, Fig. 2. A wing with flexible metal ribs was used so that the camber could be varied from 0% (a flat plate) to 15%. The results are easily read from the graph. With this speed and chord (LV=7) a 10% section is by far the best for endurance. As an amusing sidelight—someone might get away with flying the proverbial barn door (flat plate) but he would need 2½ times the power or, in model language, he could only stay up 40% as long as with the M-arc-10. (Footnote No. 4.)

Tests on a Series of Reflex Sections

Our work with airflow pictures sometime ago gave us the idea that reflex trailing edge sections might be valuable. Previous experience also indicated that they might have a slighter tendency to warp in flight; so the series in Fig. 5 was tested. Results are again easily read. Although

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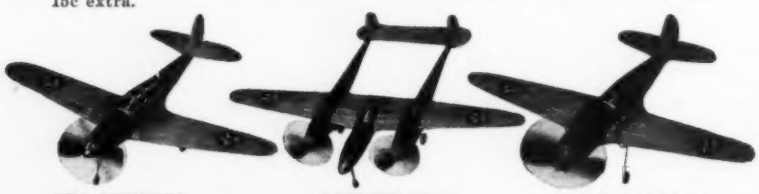

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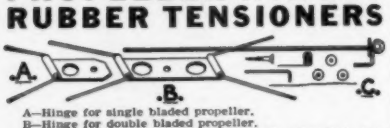

A—Hinge for single bladed propeller.
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Can be had in soft malleable or music wire fastening tabs. State shaft diameter, width of hub and length between hinging points, or make of model. Any size available. Single Blade—15c. Double Blade—20c. Both Postpaid. When properly applied the propeller blades will rest snugly against the fuselage sides.

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the best airfoil M-reflex-8 (Footnote No. 5) consumes more power than M-arc-10, the reduced tendency to warp (not tested in the tunnel) may make it a very valuable section.

Summary

The M-arc-10, a smoothly curved 10% cambered section, was the best single-surfaced airfoil tested, having a potential endurance of 2½ times that of a flat plate. The M-reflex-8 also proved valuable. Coordinates of both are shown in Fig. 6. Use either of these on your next indoor model and you will see a 10-20% improvement over standard airfoils.

Footnotes

No. 1

$$\text{Since gliding ratio} = \frac{\text{lift}}{\text{drag}} = \frac{\text{weight}}{\text{drag}} = \frac{C_L}{C_D} \frac{\text{(lift coefficient)}}{\text{(drag coefficient)}}$$

$$\text{drag} = \text{life} \times \frac{C_D}{C_L} = \text{weight} \times \frac{C_D}{C_L}$$

Also from aerodynamics formulae:

$$\text{lift} = .0012\, C_L\, \text{Area}\, \text{Velocity}^2 = \text{Weight}$$

$$\text{so that V} = \text{Velocity} = \left(\frac{W}{.0012 C_L A}\right)^{1/2}$$

From elementary physics:

$$\text{power} = \text{force} \times \frac{\text{distance}}{\text{time}} = \text{drag} \times \text{velocity}$$

$$\text{Substituting, power} = W \times \frac{C_D}{C_L} \times \sqrt{\frac{W}{.0012 C_L A}}$$

$$= 29.1 \times W \sqrt{\frac{W}{A}} \times \frac{C_D}{C_L \sqrt{C_L}}$$

No. 2

See "Streamlines," July 1939, MODEL AIRPLANE NEWS.

No. 3

See Page 15, Model Aeronautics Yearbook, by Frank Zaic.

No. 4

Designation for 10% arc-type section. (See Fig. 6).

No. 5

Designation for 8% reflex type section. (See Fig. 6).

The Microfilm Glider

(Continued from page 13)

you throw a microfilm glider up?" The answer: "You don't." The model is simply held in a level flight position, six feet above the floor, and released. Simple? What else could any one want? To you builders who have complained of lack of armories or other space to fly in, your worries are over. You could even hold contests for this type of model in your own homes or club houses. As for the duration, which seems unbelievable, the author during his experiments attained flights of forty or fifty seconds with a model of thirty square inches of wing area. This time would place in any contest. The world record for this class has already been unofficially broken. The glider conforms with all rules set up by the A.M.A. The model is very simple to construct, as the wing and tail construction and size are the same so only one drawing is shown on the plan for both. Use only the lightest balsa obtainable and take the greatest care in building and covering this super-light glider. If you are not familiar with indoor building use slightly larger sizes than indicated on the plan.

Now begin the construction of the model: First make a template of 1/8" sheet balsa, for one-half the wing. Next cut two strips of 1/64" square balsa. Soak them in hot water, bend the strips around the template and slip a small rubber band over them to hold the strips in place while drying. When dry cement the strips together to form the wing outline and at the same time pin them down on to the plan.

Make a cardboard template of the wing section and cut the required number of ribs out of 1/64" sheet balsa. Cement them in place after slicing off the proper amount of the ribs' trailing edges to conform with the plan. Next cut a strip, the required length, 1/64" square for the wing spar. Cement this at the required position to the wing tips and ribs. Use the same operation in the construction of the tail.

The body is made from a piece of light balsa 1/20" square sanded round and tapered slightly toward the rear. Next cement the wing and tail in their respective positions.

Great care must be taken in covering the very light framework with microfilm. They can be covered separately or both at the same time. For latter, make a large sheet of film and after wetting the framework with saliva press it on to the film. When perfectly dry trim away the excess film with a hot piece of wire. No dihedral is needed in either wing or tail. The model also flies without the use of a rudder.

As previously stated, the model is released from a height of six feet above the floor as required under A.M.A. rules; the model then gliding very slowly downward. If the model stalls you will notice that very little altitude is lost, as it simply flies backwards until it again gains forward momentum. This is possible because of the very large tail which causes the model to be perfectly balanced. This also eliminates the use of weight in the nose. For

flying in a room a turn can be obtained by warping down the leading edge of the tail at one tip. The author's model had a sinking speed of .15 inches per second. Best flights can be obtained in evenly heated rooms, temperatures running from 70-90 degrees and free from any disturbing air currents. If the model is entered in a contest, first find the best suited location in the armory or building in which the meet is to be held before attempting flights.

Now let's see what you can do with your glider. Any questions will be gladly answered by the author. But remember that the builder who shows the greater skill in building this model will be able to make the best flights, as this type of model puts everyone on an even basis for competition. Best of luck.

Air Youth of America

(Continued from page 31)

The new Air Youth handbook which is published in a format similar to "Model Airplane Contests: An Air Youth Guide," contains a great deal of information that isn't offered in other books. There's a fascinating chapter on weather, for example, as it affects the building and flying of models, and there is also useful information about buying and handling building materials. The book covers all phases of building from latest type gas models to elementary balsa gliders. There are two chapters on gas engines.

This handbook is the result of collaboration, though Art Vhay, Air Youth's technical director, supplied the basic information. Such well-known veterans of model aviation, as Gunnar Munnick of Boston, Steve Corbett of Detroit and Rut Fuller of Virginia, checked the book.

The book contains over 100 illustrations, including diagrams, three-view plans and photographs of model airplane clubs in all parts of the country.

Scholarship Applications Grow

Among the flood of mail from young aviation enthusiasts who are eager to qualify for the Air Youth Scholarships for advanced training in aviation, have come letters from every state, including eight young men from Puerto Rico.

Typical of the high qualifications of those entering the competition is this young man from Vandalia, Ohio, who writes:

"I have just graduated from high school and am now employed as an apprentice mechanic for TWA at Dayton Airport. I am interested in the mechanical field of aviation and am doing some home studying from material suggested by my fellow workers. It was my desire to attend an aviation school; however, shortly after graduation I was offered this opportunity to work for an airline and accepted, feeling that the practical experience would be of real assistance. I hope I shall be able to qualify."

Another boy, from Texas, writes:

"I am seventeen years old, and will graduate from high school next spring. I am now a private pilot, with 125 hours flying time. I have a 1-S rating at present but have had 12 hours in a 2-S plane and in the next few days expect to fly a test for a rating. I have built hundreds of model planes since I was eight years old."

Applications for Air Youth Scholarships will close this month and those who desire to be considered are urged to submit their qualifications promptly, together with all required information. The Scholarship Awards Committee, of which Mr. Thomas H. Beck is chairman, has announced that boys who have won recognition as model builders will be given special consideration. The Air Youth Scholarships will be given for the following aviation schools: The Boeing School at Oakland; Casey Jones School, at Newark; and the Spartan School at Tulsa. All communications should be sent to Air Youth of America, 30 Rockefeller Plaza, New York City.

Outstanding Performances Cited

Outstanding performances in the field of junior aviation during the 1940 season were cited by Winthrop Rockefeller, chairman of Air Youth, in a review by him of the past season's activities.

Highlights of the year, as pointed out by Mr. Rockefeller, were the formation of hundreds of new junior aviation clubs in all parts of the country, the increasing number of model builders being given jobs in the national aviation program and the greater activity and interest by the public in gliding and soaring. As the outstanding contribution to model aviation, Mr. Rockefeller cited the performance of the radio-controlled model of the Good brothers at the 1940 Nationals, and the "all around performance" of George Sass, Jr. of Detroit, also at the Nationals.

The contribution made by the Academy of Model Aeronautics as the rules-making body

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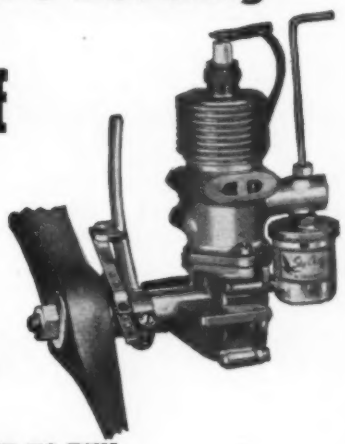

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3rd Place	Ken Clark	64.93 m.p.h.
4th Place	Earl Jones	61.24 m.p.h.

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Winner	1/4	Mile—Maximum	Speed—80.28
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"PACER"

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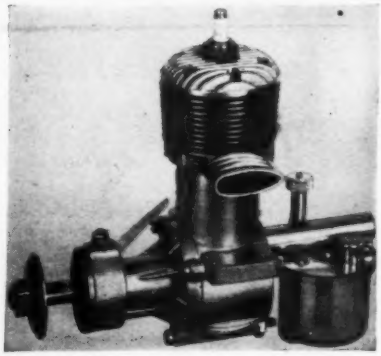

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FORSTER BROTHERS

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for model aviation, and the valuable assistance given by the National Exchange Clubs, the Junior Chamber of Commerce and similar groups, was cited by Mr. Rockefeller as important factors in the growth of model aviation.

The second annual Air Youth of America banquet was held Thursday, January 16th, at the Rainbow Room Rockefeller Center after a meeting of the council.

An Easy Way to Make Microfilm

(Continued from page 13)

previously prepared, or purchased, and quickly pour a few drops on the surface. (Hold the bottle close, for best results!) After the film stops spreading wait about 15 or 20 seconds for it to become solid, then lift it from the water.

To lift the film from the water a coat-hanger or wire hoop with the top edge straightened may be used. (On small models we usually use a re-shaped hanger.) Reach the coat-hanger (or hoop) into the water, underneath the center of the film, so that it is in a vertical position, with the flat part next to the film and the handle at the bottom (see drawing). Raise the hoop straight up with a smooth deliberate movement. This will cause the film to drape itself over both sides of the hoop, giving a double thickness. The water between the layers will drain out and cause them to adhere to each other, producing a single sheet which will be free from wrinkles, tears or sags. The double thickness requires that the original film on the water be half the thickness desired for the plane.

If the film breaks too easily, after it has been taken out of the water, it is too thin. This may be remedied by raising the temperature of the water and pouring a slightly larger amount of solution. If the film is quite strong and has a dull blue, red or green color, it is too thick. This means the water must be made cooler and less solution used. Microfilm of the proper thickness will assume a marble effect of bright blue, red, green, gold, yellow or purple or any combination of these colors. Yellow is at the thin end and blue at the thick end of the scale of proper thickness.

Blue. A good service weight.
Purple. A good service weight.
Green. A good service weight.
Red. Light weight.
Orange. Light weight.
Yellow. Very light weight.
Gold. Super light weight. (Handle with care.)
Colorless. Too delicate—not practical.

The thickness of the film, of course, will have to be varied according to the size and weight of the model.

If the directions are followed correctly your first attempt should be a success. To test the simplicity of this method of removing the film from the water, we showed a seven-year-old boy the procedure and he obtained a perfect sheet the first time!

Remember—hold the hoop or hanger vertically and lift it straight up when removing the film from the water.

Frontiers

(Continued from page 25)

appear. The set-up would be to have the automobile manufacturers make parts and certain sub-assemblies and have numerous expansive airplane companies devote their time exclusively to assembly of aircraft only. We would have our desired number of aircraft in no time. However, it would mean that the entire nation should devote exceedingly more time to the defense program and sacrifice certain luxuries. It would take reams and reams of argumentative data in debating as to whether this nation will be attacked in the next few years. For our purposes we will just state that the possibility exists, and might we not add that our lives are therefore at stake? Would it not be wise to use our vast accumulated knowledge in the design of aircraft, our unsurpassed systematized production and our unlimited resources to build such a number of airplanes for Great Britain and ourselves immediately?

The enemy cannot be conquered by defensive measures. It must be attacked. And in our present procurement program there does not seem to be very extensive plans for making use of forthcoming military equipment for attack purposes at distant points, such as far shores of the Atlantic and Pacific. It appears that here is a new field for the design of very large airplanes to ship our tanks and other equipment to foreign shores; we are now building planes with 250 foot wingspreads and can build larger, but is it not time now to build these ships in quantity? Following are some notes on what we are doing in the way of new airplanes at present.

The new Lockheed bomber for Britain, which is a slightly larger redesigned version of the Lodestar with Twin Row engines, will have a top speed of about 315 m.p.h. North American has been unfortunate in having bad crack-ups of both its B-25 bomber and new NA-73 intercepter, named the "Mustang" by the British.

Another new interesting twin-engined military airplane is the Beechcraft JRB-1 being built in quantity for the U.S. Navy. The first has been test-flown. The JRB-1 will be employed by the navy as a utility plane equipped with radio, observation and photographic installations. It is a development of the commercial 18S Beechcraft with the pilot's windshield extending upward to form the front of a streamlined turret above the fuselage. Beechcraft states that the turret allows almost unrestricted vision for special observation purposes with no appreciable loss in performance or controllability. Accommodations are provided for a crew of five. "A door within a door" is maintained on the side of the fuselage, the larger door for the crew's exit and entrance and the smaller one for photographic equipment. Placing the camera door in some other part of the airplane might interfere with the structure, thus it is built into the entrance door. Past issues of MODEL AIRPLANE

News dealt with the description of the commercial Beechcraft and its remarkable single engine performance, which is also inherent in the JRB-1.

Test flights have been made with Northrop's new seaplane for Norway. The ship has all the earmarks of the Northrop A-18 though considerably cleaned up. Each of the two floats is attached to the bottom of the wing by individual streamlined, full cantilever structures. A 9-cylinder Wright Cyclone of 1,200 hp. is mounted in the nose with the crew of three sitting in tandem directly behind it. A flexible machine gun is mounted at the rear of the crew enclosure and another is mounted in the belly. Four are in the leading edge of the wing. The airplane is scheduled to do 235 m.p.h.

Two training planes that have had a few lean years with in-line engines have now been "fattened up" with radial engines. One is the Fairchild M-62B with 165 hp. Warner engine and cockpit enclosure as new items. Otherwise this airplane appears to be similar to the Ranger-powered low-wing Fairchild trainers now being used by the U.S. Army Air Corps. The other is the new Ryan ST-3. Ryan has the following to say about this ship:

"The new Ryan open-cockpit low-wing trainer for 1941 has the familiar Ryan appearance, but otherwise it is an entirely new airplane. The ST-3, as it is called, is the commercial trainer version of a large number of new training planes being produced for the U.S. Army Air Corps."

Ryan now holds orders for $7,425,000 from the air corps for training planes to be built under the mass production type-standardization plan.

The outstanding difference the observer will first notice between the new Ryan ST-3 and previous models is that the first of the new trainers is powered with a radial engine, the proved Kinner 5-cylinder air-cooled model. However the ST-3 is also available with the Menasco 4-cylinder in-line engine.

Other important structural changes which have been made for the purpose of improving efficiency in training operations and further facilitate ease of production and maintenance are only apparent on closer inspection. The fuselage is 14 inches longer and 3 inches wider than previous models. Wide army-type adjustable seats are now installed.

The entire treadle-type landing gear unit has been changed and allows several wheel and brake combinations. The tread has been increased by more than a foot by using knuckle-type wheel mountings instead of the fork previously used. Wheels are also set further forward as an added safety factor in preventing possible nose-overs.

The familiar Ryan wire-braced wings are used, but they now have a 4 deg. 10 sec. sweepback. Windshields have been changed to the three-section military type. The rudder design has also been slightly altered to include the tail cone fairing as an integral part of the surface. A baggage compartment, accessible from the exterior and located in the section of the fuselage immediately behind the rear cockpit is another added feature.

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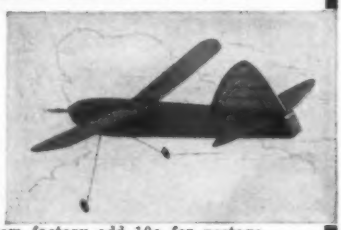

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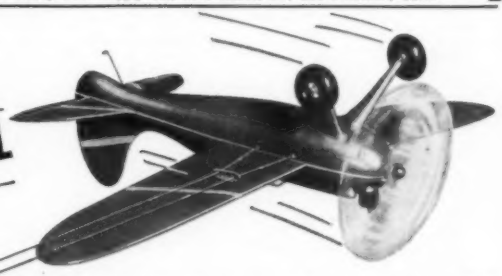

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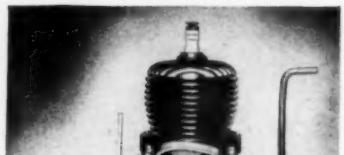
Bantam— THE Class A Motor for 1941



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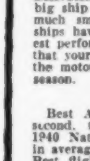

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Many times we have voiced the possibilities of a small lightplane powered by two 80 hp. engines. Several private interests throughout the country have undertaken the design of such a three-to-four place airplane with no apparent success. Interstate of El Segundo, California, who plans to build 900 of its new "Cadet" lightplanes during 1941, is now designing a twin-engined sportplane to be powered by 80 hp. Continental engines.

The U.S. Hornet aircraft carrier launched recently is the first of a series of eight now on order. It cost $31,750,000 and will carry 83 fighting planes, eight 5-inch anti-aircraft guns, sixteen 1.1-inch anti-aircraft machine guns and sixteen smaller machine guns. Weighing 19,900 tons, the Hornet is slightly larger than the Ranger of 14,500 tons. The Lexington still remains the largest carrier in our fleet—33,000 tons. The length of the Hornet is approximately 800 ft., beam 83 ft., draught 22 ft. and is manned by 2072 men.

Gas Lines

(Continued from page 21)

en's Event; Bill Butler in High Time Over Forty; Vernon Aldershaw in Class B and Paul V. Niemela in Class C. The Compton Gas Model Club won the Permanent Club Trophy Award.

Picture No. 2 is a Nomad gas model built by Richard Duncan of 1116 Dickinson Avenue, Greenville, N.C. It is a racy-looking little job, plans for which appeared in MODEL AIRPLANE NEWS last June. Duncan says:

"It weighs about two pounds, powered with a Torpedo engine, and has a terrific climb. The little plane 'can take it'—on its first flight the wing lifted off the fuselage every time it turned into the wind. Finally the rubber band broke when it was at about 75 or 100 feet altitude. The fuselage dove into the ground with the motor running but the damage was very slight—breaking the propeller, splitting the fuselage front about two inches and loosening the batteries. It was flown again, however, after about an hour of repair work."

Duncan is president of the Hub City Modelers; members have attended only three contests but shared in the prizes.

One of the most interesting models we have seen is shown in picture No. 3, on the ground, and No. 4, in flight. It is a pusher-puller of unique design, built by David Mellnish of 1209 S. Howard Avenue, Tampa. It has a 7 ft. span and is powered with two Class C motors. Mellnish is president of a real-live club, members of which are not over 16 years of age, yet are exceedingly active and turn out some very original work.

Wilfred G. Orr of 1215 Cherry Street, Saginaw, Michigan, sends us picture No. 5 in which he is shown launching his Class C Black Hawk. He says:

"It has been the source of many hours of pleasure and recreation and has won second and third places in the only two contests entered. It has over 500 flights without a crack-up to its credit."

Picture No. 6 shows Buel and Russell Carter with their Forster-powered Powerhouse, with which they've made over 94 flights with only two minor mishaps. These resulted when the ship landed beyond the flying field. The plane has a 7 ft. wing span and will climb straight up under full power, then level off into an exceptionally flat glide.

In picture No. 7 is Bill Whittet of 1020 South Sixth, McAlester, Okla., with his KGS which won first at Denison, Texas, for him, first at Ada, Okla., and third at Muskogee, Okla. It was powered with an Ohlsson "60" when it took the two first places. Whittet has been building models just one year and nine months and is a member of a club of 26 members.

The East Bay Aeroneers Association of Oakland, held a successful contest on December 8th. Airports being unavailable, the meet was held on a private ranch.

According to theory, models with high-aspect-ratio wings are excellent soarers and with any given power will give maximum duration. The winner of Class C, Don Foote, shown with his model in picture No. 8, demonstrated this to be a fact by making the high time of the meet—14 minutes, 52 seconds. The ship's span is 7 feet, 4 inches with a total weight of 3 pounds. The unusual features about the ship are its lack of fin area and the pod-shaped fuselage. This would lead one to believe that it is the design of the normal type fuselage which makes large fin area necessary. Here is something with which modelers can experiment! The ship climbs in a tight level circle at an angle of about 45 degrees, performance largely due to flat rudder and low pitch prop. The aspect ratio is 10.

Peter Bowers of 2015 San Antonio Avenue, Alameda, sends us this information and tells us "Don is sergeant at arms of our club."

An unusually fine-looking ship is shown in picture No. 9; a trimmed-down edition of the TD Coupe, appearing in MODEL AIRPLANE NEWS, October 1936. It is built by Robert B. Timm of 46 Cameron St. N., Kitchener, Ontario, Canada. He has not tried the ship yet but has great hopes for it. The span is 40 inches and is powered by a Madewell Mite. Timm would enjoy hearing from other model builders.

In picture No. 10 you see a double winner, built by Elmer Powell of 279 Jackson Avenue, Jersey City. This little ship, powered with a Bantam engine, won Class A at the Eastern States Gas Model Contest held last summer and, powered with an Ohlsson "23", first place in Class B. This is a remarkable performance and speaks well for its flight consistency. The wing incorporates a Grant-X section with an area of 320 square inches. This little job eventually was lost at the Staten Island contest, powered with a Bantam No. 263. If anyone finds this ship will they please return it to Powell?

Edwin C. Schunke of 1124-4 Avenue N., Fargo, N.D., is a model engine enthusiast and has spent a great deal of his time in technique study, which has resulted in the two beautiful small engines shown in picture No. 11. The upper engine is a .6 cubic inch twin, developing 1/3 horsepower and weighing 7 ounces. The lower one is a .12 cu. in. twin, similar to that used in winning second in the Open Event at the 1939 Nationals. This motor weighs 12 ounces bare and develops 3/4 hp. at 8500 r.p.m. Schunke says these motors are the easiest-starting,

smoothest-running, highest-powered engines he has ever seen. Some of the features responsible for this extreme power output are a new style true rotary valve, highly improved porting, as well as a synchronized mixture and spark control. The engine speed can be instantly and positively varied through the entire engine-speed range without any adjustments aside from the speed control itself. Schunke has won places in six major contests.

Picture No. 12 shows a fine example of a dummy model Twin Row Pratt & Whitney Wasp Jr.; built to a scale of 1/16" to the inch and little less than 3 inches in diameter. The crankcase and adjoining parts are turned from balsa wood; the wheel and cylinders cast from plaster of Paris. Other parts, such as the intake pipe, were constructed of wire of which more than six feet were used. The model contains built-in gears, allowing a small electric motor to turn the propeller. The whole engine contains more than 300,000 separate parts and required 150 hours to build. Donald Armstrong of 304 South Park Street, Fairmont, Minn. is the builder, and this is his second dummy model engine.

Donald R. Lewis, contest director, writes and tells us of the Mid-West Model Airplane Contest held at Greenfield, Iowa on Sunday, September 1st. He says the news is a little late but "better late than never." This was no back-light affair; there were 92 entrants and a total of 1500 spectators. In this locality this was an extremely large meet and is indicative of intense interest in the sport. The contest was held on the farm of J. R. Hamilton. Both gas and rubber models were flown.

Karl Girten of Milwaukee won Class C Open with a time of 2:33.8. In Class C Senior Richard Clement of Marshalltown, Ia., won with a flight of 3:02. Second was Bill Ruzicka of Omaha with 2:10. In Class B Don Everhart of Marshalltown won with 2:35.3. Whit McCormack of Atlantic, Ia., won second with 1:41. In Class A: Bill Parmenter of Lincoln flew 3:20.9. Second, Bob Andrus of Des Moines with 1:35.8. Winners in the Rubber Power Class C & D for 16 years or over, were: Gilbert Baird of Fontanelle, Ia., with 2:31.9; Bob Andrus, 2:14.1. In the same class for those under 16 years, were: first, Bill Parmenter with 2:38.5; second, Alfred Lean of Marshalltown with 1:24.3.

Picture No. 13 shows a view of contestants on the field. The weighing table is shown at the extreme right.

The influence of the war has become mighty apparent in model airplane building. At least the judges in the fourth annual Solid Scale Model Building Contest conducted by the Stix, Baer & Fuller Model Airplane Club in St. Louis thought so when they looked at the 86 entries on November 30. While in previous years, historical models and passenger ships were in the majority, practically all model builders this year concentrated on military planes of American, British and German make.

Stanley Dubowski, 18, was awarded first prize in the Senior Class for his Vought-SBU-1 model (a scout bomber of the U. S. Navy). Stan built the ship in three weeks, at 5/8" to a foot scale. Second prize went to Dale Johnston, 24, for a Howard D-6 A-8, and third prize to Tony

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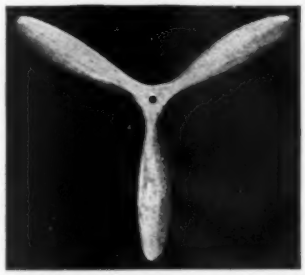

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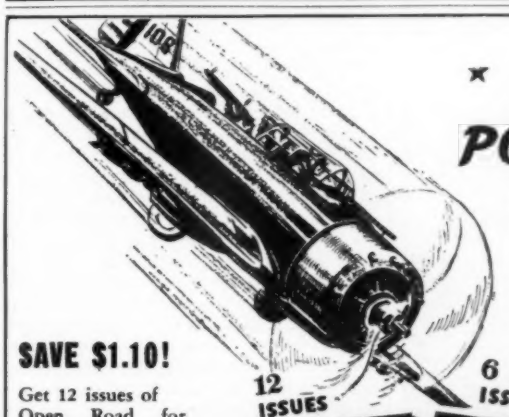

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Schott, 20, for a Moraine-Solnier 1913. Judgment was based on fidelity to scale, general workmanship and coloring.

In the Junior Class (open to boys up to 14 years of age) Jim Upchurch, 14, was judged the winner with his Stinson 105 model. Charles Robertson, 13, won second prize for his Berliner-Joyce OJ-2, and Charles Juergens, 14, was awarded third prize for his Stuka Dive Bomber.

Judges included A. W. Courtail, Jr., aeronautical engineer at Curtiss-Wright; Margaret Mellon, "Miss American Aviation of 1940", Chicago & Southern Airlines; Robert Whelove, expert model craftsman; and Robert H. Sommers, director of the Stix, Baer & Fuller Model Airplane Club.

Picture No. 14 shows Stanley Dubowski receiving the first-prize trophy from "Miss American Aviation", Miss Margaret Mellon. Stanley holds the little model which won him the award.

Pennsylvania

Some interesting comments come from the editor of the *Quaker City News Flash*, W. Beaumont.

"Bill Lukens tried to squeeze his 6 ft. wing between cornstalks 2 ft. apart but found out it wouldn't work. Suggest that he put cat's whiskers on each wing tip to test size of opening before going through."

"Philly" model builders are "squawking" about their home city having a wonderful convention hall yet in the past it has been necessary to secure the use of the hangars at Lakehurst when they wish to fly indoors.

Boys from Philly are not alone in this respect; this condition exists in every large city in the country and is primarily due to the lack of parents' interest in the welfare of their children. We are not pulling any punches in this respect: American parents are "falling down" miserably when one considers the things they have not done to promote their children's welfare.

Many look upon model building and flying as "child's play"; actually it is only child's play when children participate. However, the game embodies the deepest principles of science and challenges the intelligence of the wisest man. It all depends how far into the matter one wishes to go—children merely touch the surface; namely, the more mature not only derive valuable information from it but the greatest of pleasure and outdoor recreation.

It would do well for parents to investigate the possibilities of this great sport in helping their children develop initiative, knowledge and health that they will require to fight the battle of life.

There is an old saying: "Wake Up America!" We wish to add to that: "Wake up American Fathers and Mothers! Take a little time from adult parties to give your children the proper guidance."

Ohio

Mrs. John W. Hilligas of 7804 St. Clair Avenue, Cleveland sends the following account of a recent contest:

"Despite cold wind and rain the combined Cleveland Balsa Butcher and American Airlines Gas Model Airplane Clubs Contest got under way on Nov. 10, 1940. Officials were tempted to cancel the meet but finding so many contestants from Michigan, West Virginia, Pennsylvania, New York and distant points in Ohio, it was decided to permit hand-launching and go on as planned. More than seventy contestants entered in one or more of the three classes.

"Mrs. Harry D. McCall, Miss Nora Turner and Mrs. John W. Hilligas, representing the Cleveland Woman's Chapter of the N.A.A., were in charge of the registrations. Mr. Ed Clarke, Junior Aviator Editor of the *Press* was Contest Director. He was assisted by local model dealers and others interested in model aviation. The public address system was loaned by the Standard Oil Co. of Ohio.

"The outstanding flier of the meet and winner of the American Airlines Trophy was Bill Schwab of Cleveland. Longest flight of the day and winner of the Rudolph Deutsch Trophy: Elmer Shapiro, Cleveland (Time 5 min. 10 sec.). Winner of Class A and the Arlene Davis Trophy: Alan Vopal; second, Dick Korda, Cleveland; third, Ellwood Phillips, Buffalo, N.Y.

"Winner of Class B and the Harry D. McCall Trophy: Frank Simmons of Chagrin Falls; second, Carl Buehler, New Philadelphia, O.; third, Bill Schwab.

"Winner of Class C and the Harold Covert-Geo. Landreth Trophy: Elmer Shapiro; second, Don Lapworth, Detroit; third, Mike Morel, Cleveland."

Florida

We wish to extend the greatest sympathy to the parents and associates of Allen Roberts, a member of the Model Flyers' Club, who was a grand model builder. Allen recently died on one of his first sleigh-rides, when he struck a rock and crashed into a pole. He was in Pittsburgh at the time, visiting his aunt, Mrs. C. E. Turner of Brookline.

We wish to thank Ila Rickel of 3127 S.W. 21 Street, Miami, for this information. She was secretary of the aviation club and upon many occasions Allen was her assistant.

Alaska

Don H. Guild of Fairbanks, Box 2021, is looking for a set of gas model plans for a twin engine ship, of about 6 ft. span. He has two M & M engines with which he wishes to equip it. If anyone can supply these plans, together with other details such as approximate finished weight, he would be extremely grateful. Guild, as a resident of Fairbanks, is away from the center of activities; consequently he must appeal to other builders for a little assistance.

In his experience with skis, which must be used in Alaska, he found using rubber bands as a shock absorbing device was unsatisfactory as the extreme cold would freeze the rubber and cause it to lose elasticity. He will be very pleased to answer any questions concerning flying in sub-zero temperature.

Notices

A new adhesive has been discovered of the cold-setting resin type. It is bacteria-proof, rotproof, and stain-free, and can be used immediately after mixing with water. The use of heat is not required at any time during its application. It will stand as much as 2500 pounds stress, when used with mahogany and other hard woods. A glue of this type should be extremely valu-

able in cementing the engine bulkhead to the main part of the ship, where great strength is required to withstand engine vibration and hard landings.

Flash News

(Continued from page 31)

now being tested.

Additional hangers and facilities will be provided Hickam and Wheeler fields in Hawaii with an award of $1,687,100 by the army air corps.

The 80th and 81st School Squadrons and the 68th Air Base Group has been transferred from Moffett Field to Stockton Advanced Flying School in California. More than one thousand students, instructors and enlisted men and 54 airplanes will be flown to the new base.

A drive to enlist 51,000 three-year recruits has begun by the air corps' new flying enlistment corps. The corps criss-crosses the nation in huge Douglas C-33 transport planes fully equipped as offices. This huge number of recruits is expected to be in service before the end of 1941.

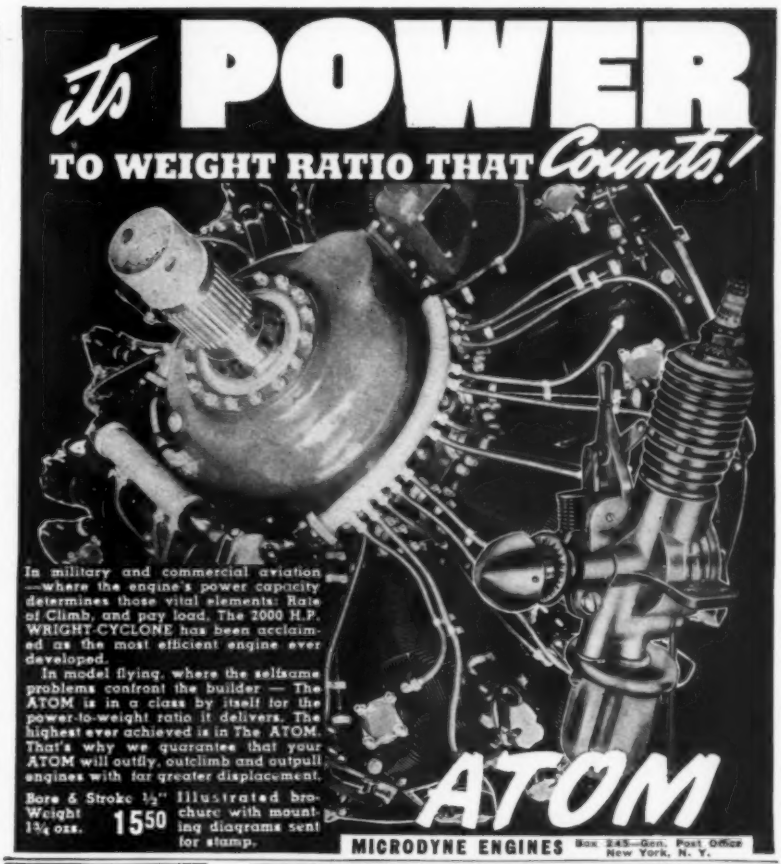
Construction has begun on the huge Fresno Air Base to house the 2700 officers and men and 77 planes of the 15th Bombardment Wing, the 47th Bombardment Group and the 20th Reconnaissance Group. Douglas B-25 bombers are the new equipment now in active service with these squadrons. A total of $1,587,000 will be expended.

His second forced landing in as many days left Lieutenant Clair E. Ryan stranded in the middle of the Arizona Desert, when his Northrop A-17 attack plane developed engine trouble. Student Pilot Jack Edmund Walker, in training at the Cal-Aero Army Flying Center, narrowly escaped death in the crash of his Stearman PT-13A biplane trainer when it plummeted into a Southern California orange grove after he lost control during acrobatic training maneuvers. Second Lieutenant Victor V. Kilmer and Staff Sergeant Owen W. Cecil of Chanute Field, Rantoul, lost their lives in the crash of their North American BC-1A basic combat plane. Lieutenant C. L. Hamilton, attached to Hamilton Field, lost his life in the crash of a Grumman Air Corps amphibian while attempting a landing on Clear Lake near Lakeport, California.

NAVY.—One of the most miraculous feats in naval aviation history was the landing of a giant Consolidated PBY flying boat in a tiny puddle of water only 3 inches deep and fifty yards long in the sparsely settled cow-country of Southwest Texas. After three of his crew had bailed out during a heavy storm, Lieutenant Murray Hanson, commander of a delivery flight of three of the huge bombers, brought the plane down. The other two planes reached the Corpus Christi destination safely. The ship, undamaged, will be dismantled and shipped back to San Diego.

Twelve Model PBY flying boats completed the non-stop flight from San Diego to Honolulu recently without public announcement or fanfare. Now routine operations, the 3,000 mile hop was made by the 11th Bombing Squadron.

The huge U.S.S. Hornet, latest of Uncle Sam's aircraft carriers, has been launched at the Newport News (Va.) site of its con-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struction. Costing $31,000,000, the giant craft brings to a total of seven the U.S. flotilla of sea-going airports. The Hornet will accommodate 83 fighting planes on its deck and half-again that number in the spacious hangers below-deck. A total of 16 aircraft carriers has been included in the two-ocean navy expansion bill.

The Moffett Memorial Trophy for safe flying has been awarded to Lieutenant Marion Reed, leader of the naval aviation unit aboard the cruiser Phoenix. The handsome silver plaque is awarded annually to the squadron, group or unit amassing the highest number of safe flying points throughout the year.

Ordered by the U.S. Navy: $36,250,455 worth of Grumman F5F-1 twin-engine single seat fighters. Largest order yet received by the company, Grumman Aircraft Engineering Corporation, Bethpage, Long Island, the award includes spare parts for an additional 50 airplanes to the total of 1640 of the speedy combat planes.

A Consolidated PBY-3 twin-engine flying boat was used to deliver mail and dispatches daily to President Roosevelt while at sea on his recent inspection tour in the West Indies.

Fifteen PBY Bombers of the 26 Bombing Squadron, Pearl Harbor, T.H., recently made a non-stop flight to Manila, P.I. Stressed conditions in the Far East made this move imperative.

After long and bitter controversy, Treasure Island in San Francisco Bay, home of the Golden Gate Exposition which closed last Fall, will be the site of a powerful U.S. Naval Air Station and construction will begin immediately. Bombing squadrons, equipped with new long-range Martin PBM-1 flying boats will be stationed there when the base is completed. The city has desired the site for a metropolitan airport but the state of national emergency which now exists made the final decision imperative to release the land to the navy.

Test Pilot Rudolph B. Lechner of Douglas Aircraft Corporation was killed when his speedy Douglas SBD-1 scout-bomber plunged in a vertical dive and came to rest in 30 feet of marsh land. The ship, intended for the 15 Scouting Squadron at San Diego, was being tested prior to delivery.

THE INDUSTRY.—The aircraft industry expansion program now stands on a "Plants in 1940—Planes in 1941" basis with plant expansion underway to such a tremendous extent that plane production is lagging. Every major aircraft company in the nation is trembling and quadrupling its floor space.

DOUGLAS Aircraft, in addition to its gargantuan plant now a-building in Long Beach, is preparing drawings for a huge factory at Fort Worth. The War Department will foot the bill to the tune of ten million dollars. Work is progressing on A-20 and A-20A (the latter supercharged for high-altitude combat) light attack-bombers, "Boston" models for the Royal Air Force, SBD-1 scout-bombers for the navy, the giant XB-19 Bomber for the army, and DC-4 four-motored transport planes for United, American and Pan-American airlines. Total employment is 19,200 and the present back-log is $351,000,000.

CESSNA Aircraft (Wichita) has doubled its factory space with an addition of 110,000 square feet factory space and 8,000 square feet office space. The structure costs $326,000 and provides production facilities for 40 twin-engined air corps training planes per month. Present back-log is $11,586,000.

CONSOLIDATED Aircraft (San Diego) has made arrangements for the construction of a huge new plant at Tulsa for the production of four-motored bombers for Britain and the U.S. Air Corps. Production on flying boats will thus be concentrated at the San Diego location. The new structure will cost ten million dollars, financed by the War Department. Models now in production are the PBY twin-engine flying boat for the U.S. Navy and the Fleet Air Arm in England, the PB2Y four-motored design for the navy and the B-24 four-motored bomber for the air corps. Present back-log: $320,000,000.

NORTH AMERICAN Aviation (Los Angeles) will concentrate production on its new B-25 light attack-bomber in its new Kansas City plant, plans for which were recently completed. Construction on the Dallas plant is now well under way. Other models are standard two-seat monoplane trainers for the army, navy and several foreign governments. The "Harvard Mark II" for the Royal Air Force is now being turned out at the rate of eight a day. The NA-73, Allison-powered single-seat fighter is being rebuilt after its crash on a test flight. Eng-

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A NEW Revolutionary IDEA Opening an Entirely New Field in Model Flying

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Towline Launched Glider with "SPIRAL CONTROL" (PAT. PEND.)

The first really new idea in towline gliders in 10 years. No longer are long, zig-zag runs necessary to release the glider once it reaches altitude. No longer is it necessary to sacrifice a spiral glide in order to have a stable launch.

"SPIRAL CONTROL" works like a miracle. Just attach the "SPIRAL CONTROL" stick to SINBAD. Run a few feet in a straight line with the towline and SINBAD will shoot skyward, automatically releasing itself at the highest part of the launch. Then watch it glide! SINBAD spirals and eases its way into the nearest thermal for the longest, sweetest flight you ever saw. The secret of "SPIRAL CONTROL" is all contained on the most complete set of plans you ever worked from. Meets all A.M.A. glider rulings.

50" WINGSPREAD

WING AREA 250 SQ. IN.

1. Big 33x44" Plans with step-by-step construction drawings.
2. Balsa covered leading edge on wing.
3. Novel, removable ballast box.
4. All wood parts clearly printed out.
5. Silkspan covering.
6. Liberal quantities of cement and dope.

Model in launching position with "Spiral Control" attached

Designed by Henry STRUCK

This is Henry Struck's latest creation. Those who have built the Flying Cloud and the American Ace know the value found in **BERKELEY - BUILT,** Struck - designed kits. Real glider days are just ahead. Get your kit now and start building. Tell your local contest director to include towline gliders at your coming meet.

Complete **$1.00** 10c EXTRA BY MAIL

The MOST Popular "B" Gas Model in America

Henry STRUCK'S 54" Wingspan AMERICAN ACE

$3.95 P.P.

INCLUDING

Silk Covering
Rubber Wheels
Finished Prop

Not since the Buccaneer Standard evolutionized gas model flying three years ago has any one gas model met with such immediate popularity. Actually it is the first sport gas model that gives super contest performance.

Thousands have already been built and flown during the coldest months. Now with spring close at hand, everybody who flies Class "B" gas jobs must have an American Ace.

Removable Nose & Motor Unit
Formed Piano Wire Landing Gear
Printed Wood Parts
Silk for Pylon and Wing Center
Semi-Finished Wood Blocks
Streamlined Rubber Wheels
Carved Propeller
Championship Berkeley Cement and Dope
Full-size Plans

Everybody's raving about the new American Ace. Adapted from Strucks' famous "New Ruler" gas model, the most popular ship at the 1940 Nationals and winner of three out of ten places. Designed for maximum performance with engines of .29 cubic inch displacement, it can be powered with any engine from .19 to .49 displacement.

$3.95 p. p.

BUCCANEER "SPECIAL"

6 ft. Wingspan
3 lbs. Complete

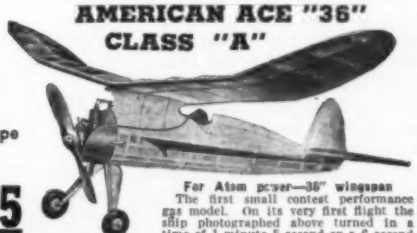
Those who build the BUCCANEER Special alone know what a great ship it is. The highest strength-weight ratio of any model airplane. A glide ratio that is so amazing that it is a mystery. Everything points to the BUCCANEER Special as your best bet in Class "C."

Less than one month after its introduction it was first place winner at the Grumman Meet. Bethpage, L. I.

The kit has the completeness of all BERKELEY kits, including Silkspan covering, clear and colored dopes, and a BERKELEY "Time-Air" Flight Timer and ignition switch.

$5.95 p.p.

AMERICAN ACE "36" CLASS "A"



For Atom power—36" wingspan

The first small contest performance gas model. On its very first flight the ship photographed above turned in a time of 1 minute 5 second on a 6 second engine run.

Kit is complete with cement, dope, printed wood, silkspan, ready made landing gear, wheels and decal insignia.

$1.50 p.p.

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MODEL AIRPLANES—KITS—SUPPLIES

WINNER of Liberty Motor Mart December issue contest—Ray Nielsen, Idaho. Liberty Motor Mart, 539 Brett St., Inglewood, Calif.

BROWN AERO RUBBER—Hodgman Rubber Company, 261 Fifth Avenue, New York City. Chicago Office: 412 South Wells Street. Dealers and manufacturers only.

THE MOST for your money in Motors, Kits and all Supplies. Catalog 5c. Highest allowance for your old motor. Send your inquiry before you buy and save money. Huber, 50 Tariff St., Sayville, N.Y.

GUARANTEED used motors $2.95 and up. Highest allowances on new motor trade. Write stating make of old motor and new motor desired. Special: $9.95 and old motor gets $16.50 Tiger motor. Steinke Motor Service, Waterford, Wis.

MODEL BUILDERS: Attention! Send for price list. We specialize in all supplies for gas and rubber jobs. Jerry's Supplies, 686 Riverdale Ave., Brooklyn, N.Y.

SWAP new Ohlsson No. 23 motor for good stamp collection U.S. or foreign. Exchange your duplicates for gas model supplies. Don Robinson, 116 West Francis Ave., Brentwood, Pittsburgh, Pa.

MODEL, Parts, built to order. No part too small, no model too big. Send your specifications today. Craftsman's Service, Bristol, Vermont.

SPECIAL War Series—Messerschmitt, Stuka, Spitfire; 35c each, 3 for $1.00 postpaid. Free gift with purchase of $1.00. Send for free catalogue. Empire Model, 321 Vernon Ave., Bklyn, N.Y.

FOR SALE Assembled gas models! 1 Mercury B $15.00, 1 Zipper A $10.00 less motor. Money back if not satisfied. Peter Czepiel, 16 Bridge St., Deep River, Conn.

MISCELLANEOUS

WORLD WAR Aviation Books and Photographs. New and Used, Technical-Historical, Modern. All branches of Aviation. Send 3c stamp for M list. Trades considered. We Buy Books. Airbooks, P.O. 958, New Rochelle, N.Y.

WORLD WAR Propellers make fine decorations for den, club rooms, etc. Beautiful hardwood with coppered tips, refinished, $6.00 fob Houston. Tippit, Box 4621-N, Houston, Texas.

land will be the purchaser.

NORTHROP Aircraft (Los Angeles) whose recent plant expansion is being followed by a second and larger structure, has announced completion of the first seaplane dive-bombers for the Norwegian Government. Tests conducted on the two-seat floatplane, at Lake Elsinore, indicate it has surpassed preliminary performance figures. The $1,500,000 contract is for 24 planes. Present back-log: $25,000,000 including subcontracts from Douglas, Lockheed and Boeing.

INTERSTATE Aircraft (Los Angeles) has begun test flights on its new "Cadet" light trainer. Orders for 25 are already on hand, including awards from Peru and Chile. Twenty planes are now on production lines and tooling for four-a-day schedules is being completed.

CURTISS-WRIGHT has purchased the old Marmon automobile factory at Indianapolis for the production of electrically controlled propellers for the U.S. Army, U.S. Navy and England. Production is being speeded on the famed P-40 for England and the new P-40D for the U.S. Army Air Corps, at the Buffalo plant of the firm.

New companies: Twentieth Century Aircraft, founded by Roscoe Turner and other ex-air-race kings, has begun construction on a new plant in San Diego for the production of a new type all-plastic training plane.

Doak Aircraft has completed its Hermosa Beach (California) plant and is starting production on a light, two-seat training plane.

FOREIGN.—Three of Pan American Airways' six new Boeing model 314 transoceanic flying boats have been purchased by the British Purchasing Commission. The sale was approved by the Treasury Department. The huge ships will be converted into patrol-bombers for the British Fleet Air Arm by addition of guns, etc.

Fifty-two Wright Cyclone motors purchased in 1938 by the Mexican government for the republican forces in Spain have been re-sold to the British Royal Air Force. The engines have been stored in Mexican Air Force hangars but are well-preserved.

Greece has been offered the right to purchase American war planes in whatever quantities desired, it was recently announced by the Treasury Department. Although production schedules would make delivery impossible for at least two years, the possibility of attachment and re-routing of finished planes loomed. The tough, valiant nation needs patrol bombers and low-flying attack-planes. Greek emissaries have visited Martin, Douglas and Consolidated plants for observation and discussion of the plan.

Employees of the Pioneer Parachute Company donated five parachutes to be worn by the crew of the Lockheed "Hudson" bomber, donated by employees of the Lockheed concern in Burbank, California. "We all hope the men in the plane never have to make use of our gift," was the note attached when the plane landed in England. It was flown non-stop to London from Botwood, Newfoundland, by Jimmie Mattern, renowned long-distance flier.

A total of 1500 warplanes has been sent to England by the American aircraft industry, it was recently reported by government officials.

CONTROVERSY: The commercial vs. military aircraft battle is now in full swing. The action of the army air corps in commandeering 40 TWA, UAL and American Airlines Douglas DC-3 transports and 12 Lockheed Lodestars has touched off a spark which is now in full flame. A possible solution, the best one offered to date, has been presented to President Roosevelt by Philip Murray, President of the C.I.O. It consists of having the slowing and idle portions of the automotive industry take over fabrication of commercial airliner parts and assemblies and leaving only the final assembly operations to the Lockheed and Douglas companies. In the light of commercial airline importance for U.S. Mail, passenger transportation, air freight express, etc., which far exceeds the importance of our building warplanes for foreign countries, it is expected that an early solution to the controversy will be reached.

EASTERN LIGHT AIRPLANE EXHIBITION

The Eastern Light Airplane Exhibition, a section of the National Sportsman's Show, will be held at Grand Central Palace, New York City, Feb. 15-23. A number of model exhibits will be featured. Some of these are: Model Airplane Club of the Air (WOR), Polk's Modelcraft Hobbies, Ideal Model Airplane Co., and MODEL AIRPLANE NEWS. The Model Airplane Club of the Air is sponsoring an essay contest for model builders in connection with its exhibit. You shouldn't miss the many interesting designs and gadgets that will be shown.

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AIRSPEED
PROPELLERS

A Statement by
CARL GOLDBERG

Because of the need for more efficient gas model propellers, Comet asked me to work out a superior line. Months of experiment and several thousands of tests finally developed the new Comet "Airspeed"—the highest thrust prop made for gas models.

Carl Goldberg

Comet comes through with the kind of props you've been looking for! Carefully designed for utmost efficiency, tested with scientific instruments for maximum thrust, precision manufactured on exclusive special automatic equipment, and super-finished to smooth perfection! They carry Carl Goldberg's stamp of approval! Comet Airspeed 35—hand-rubbed and polished to a high gloss, 35c. Airspeed 25—carefully finished and lacquered, 25c. Airspeed 15—partly finished, unlacquered, 15c. All props 8" to 14".

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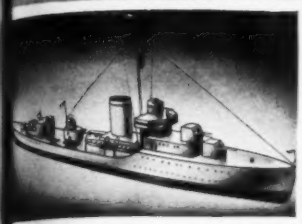
A WAVE OF POPULARITY!

COMET Boat Models



U. S. DESTROYER—authentic model of Uncle Sam's swift fighters. Kit No. K9—12" long 25c
Kit No. K10—U. S. Battleship, 12" 25c

U. S. SUBMARINE—our navy yards are busy turning 'em out. Kit No. D8, 8" long 10c
Kit No. D10—Tugboat 10c

U. S. AIRCRAFT CARRIER—Comet quality at low price. Kit No. D7—8" long 10c
Kit No. D11—Freighter 10c

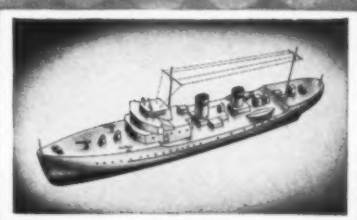
The "Gypsy" Sailboat

COMET SAILING SLOOP "GYPSY"

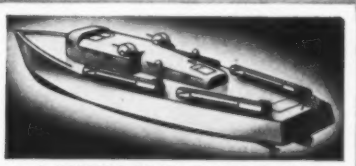
Designed to sail—and how! Authentic down to the last detail—including planked balsa hull. Kit includes sail material and keel ballast. Plan contains sailing directions—how to "tack," etc. Swell for sailing in small ponds, pools and lagoons. Kit No. U4—15" long 50c

Postage on any boat model shown, 15c; none if ordered from dealer.

U. S. CRUISER—Kit No. K7, 12" long 25c
Kit No. K11—Aircraft Carrier, 12" 25c



COAST GUARD CUTTER—A swell model, easily built. Kit No. D9, 8" 10c
Kit No. D12—Mine Sweeper 10c



U. S. TORPEDO BOAT—Kit No. K8, 10" 25c
Kit No. K12—Submarine, 12" 25c

COMET WAR PLANES

What a chorus of approval greeted Comet's newest war models! Model builders raved about the new construction features that make them sturdier, easier to build; their correct color insignia and the parts to make and install pilots. Designed exactly to scale from latest data and photos—and grand flyers! Typical Comet values—more for your money in every way! See them—buy them—at your Comet dealer! Postage on any model shown, 15c—none if ordered from dealer.

BOULTON PAUL "DEFIANT"—new-type British ship with four machine guns in motor-driven turret. Kit No. E25—25" wing span 25c

"STUKA" DIVE BOMBER—famed German ship; three machine guns, four small, one large, bombs. Kit No. E26—25" wing span 25c

MESSERSCHMITT—single-seat German fighter; top speed 350 mph. Kit No. A37—8" wing span 10c

COMET WAR MODELS
Authentic! Realistic! Easily Built!

SPITFIRE—pride of the R. A. F. Fast, heavily armed. Kit No. A38—16" wing span 10c

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HURRICANE—England's great interceptor-fighter! Kit No. A36—16" wing span 10c

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Gas Model
$15.75

MEGOW "199" MOTOR

New 1941 Improved Model — $12.50

New Type Ignition Coil . . . New Crank Shaft and Counter-balance milled to a square to take the . . . New Improved Timer with glass-hard non-wearing Cam.

Bore and stroke, ⅛". 1/7 H.P. R.P.M. Max. 10,000. Disp. .199 cu. in. Wt., 3½ oz. Block tested. Operates equally well upright or inverted. High speed bronze bearing.

WAR PLANES

SPITFIRES. British fighters. 50" flying models, **$1.00.** 23" flying models, **25c.**

STUKA BOMBERS. German Dive Bombers, Junkers JU 87B, 50" flying models, **$1.00.** 30" flying models, **50c.** Small solid balsa-wood models, **10c.**

WITH the new RANGER—and the Megow "199" Motor—you have a Balanced Unit . . . an airplane model and a motor MADE FOR EACH OTHER! Saves you days of experiment and changing. Gives you the thrills and the prize-winning flights of the experts!

By making both the model airplane and the motor, Megow scores the most important advance in gas model building made in many a day. Brings you, too, the higher power and quicker starting of the year's most sensational motor—and the airplane model that has been winning regularly wherever it appears. Everything BALANCED for your success.

Primarily a Class B model, holding the National "open" record, the RANGER is a Class A when using the "199" motor. Its span is 46 inches, wing area, 325 square inches, and weight ready to fly, 18½ ounces. Complete kit with motor, $15.75. Kit only, $1.50. Motor, $12.50.

The big, new 132-page Megow Catalog offers the most extensive line of hobbycraft kits, tools, parts and supplies. Shows scores of models—airplanes, ships and railroads. Send 10c for your copy today!

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